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FISH AND WILDLIFE SERVICE

COMMERCIAL FISHERIES REVIEW

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EFFECTS OF TEMPERATURE UPON THE STORAGE LIFE OF FRESH SHUCKED PACIFIC OYSTERS (OSTREA GIGAS)[1/]

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ABSTRACT

SHUCKED PACIFIC OYSTERS WERE STORED IN FRICTION-LIDDED JARS AT FOUR DIFFERENT TEMPERATURES. PERIODICALLY, SAMPLES WERE EXAMINED FOR CHANGES IN pH AND TOTAL BACTERIAL COUNT. A SEPARATE EXPERIMENT WAS PERFORMED TO DETERMINE THE BACTERIOLOGICAL SIGNIFICANCE OF THE INITIAL COOLING RATE OF JARRED OYSTERS. THE RESULTS INDICATED THAT RAPID COOLING AND LOWER TEMPERATURES (IN THE NEIGHBORHOOD OF 32° F.) WILL PROLONG THE STORAGE LIFE WHILE SLOW COOLING AND HIGHER STORAGE TEMPERATURES WILL BE CONDUCIVE TO RAPID SPOILAGE.

INTRODUCTION

Two important factors in considering the storage of fresh shucked oysters are the speed of cooling after shucking and the temperature of storage. Without consideration of these factors, it is possible that oysters can become an undesirable and even dangerous food product.

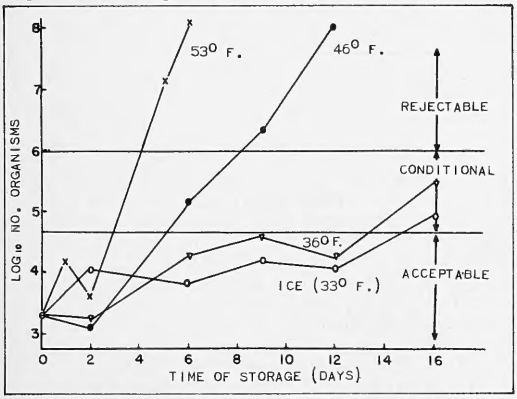

FIG. 1 - TOTAL BACTERIAL COUNTS OF PACIFIC OYSTERS DURING STORAGE AT VARIOUS TEMPERATURES.

Because of the nature of the animal, its habitat in shallow coastal waters, and handling in preparation for market, a variety of micro-organisms is often present in the edible portions. Under proper conditions, these organisms can multiply rapidly and thereby cause spoilage. In addition, while most of these forms of microbial life are not harmful to the consumer, on occasions there are, at least, small numbers of bacteria which are fecal in origin. It is entirely possible that this latter group might include typhoid, paratyphoid, and other forms of human disease organisms.

The best initial means of avoiding bacterial spoilage and the associated dangers is the minimizing of contamination of clean growing areas and careful sanitation during processing. Proper refrigeration is a necessary adjunct (as it is for all foods which are sold fresh) for keeping bacterial growth at a minimum level until the product has reached the consumer.

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1/PRESENTED AT THE ELEVENTH ANNUAL CONVENTION OF THE PACIFIC COAST OYSTER GROWERS ASSOCIATION, BELLINGHAM, WASH., AUGUST 15-17, 1957. ALSO CONTRIBUTION NO. 29, SCHOOL OF FISHERIES, UNIVERSITY OF WASHINGTON, SEATTLE, WASH.

Much literature has been accumulated on the various tests for the measurement of bacterial populations in oysters (Tanner 1944). Among the techniques generally used

Table 1 - Current Bacterial Indices and Control Limits for Shucked Oysters

Class	M.P.N. for Coliform Organism (org./100 ml.)	Total or Standard Plate Count (org./ml.)
1. Acceptable	Less than 16,000	Less than 50,000
2. Conditional (pending further investigation)	16,000-160,000	50,000-1,000,000
3. Rejectable	Over 160,000	Over 1,000,000

are the determinations of the "Most Probable Number" (MPN) of coliform organisms and the Standard Plate Count for "total" number of organisms (Anonymous 1954). The MPN determination is for organisms of fecal origin and when applied to a product is used solely for the estimation of the sanitary quality. The "total" count, on the other hand, yields information as to the sanitary quality and/or the storage conditions and storage life of the product. The current United States Public Health Service recommendations (anonymous 1954) are that shucked oysters be classified according to the levels described in table 1.

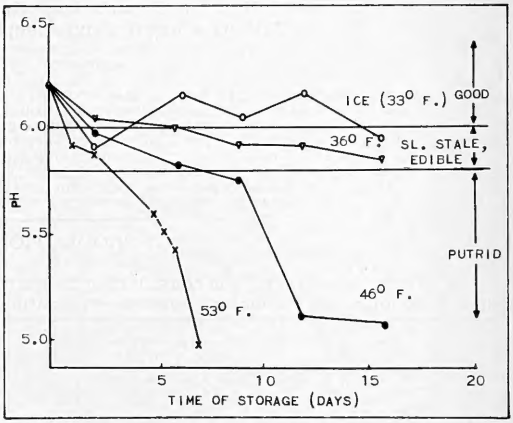

FIG. 2 - pH OF PACIFIC OYSTERS DURING STORAGE AT VARIOUS TEMPERATURES.

A measure which often has been used as a rapid indication of spoilage of oysters is the acidity or, as it is alternatively known, the hydrogen ion concentration or pH. The acid in oysters arises from the breakdown of the muscle sugar, glycogen, into lactic acid. This breakdown can be caused by autolytic activity of the oyster itself and by micro-organisms, as a result of their growth and metabolism. Regardless of the causative agent, many investigators (Piskur 1947; Pottinger 1948; Anderson, Betzold, and Carr 1949; Bordaweker 1950; Gardner and Watts 1956) have found that there is an increase in the amount of acid (indicated by the decline in pH value) associated with organoleptic changes of flavor, odor, and appearance. While there are differences due to variety, season, and area, the relationships indicate generally that, when both liquor and meats have a pH of 6.0 or above, oysters are acceptable organoleptically. A pH range of 5.8 to 6.0 has been correlated with borderline acceptability, and pH's of 5.7 or lower have been associated with unacceptable quality.

This paper is concerned with the effects of good and poor refrigeration practice in relation to bacterial growth and spoilage during cooling and subsequent storage. "Total" bacterial counts and pH measurements have been employed to determine the progress of spoilage of shucked oysters which were stored at various temperatures.

EXPERIMENTAL PROCEDURE

Samples of Pacific oysters (Ostrea gigas) were obtained from the Samish Bay area of Puget Sound. Prior to shucking, these oysters had been held for two days in the shell.

Immediately after shucking, the oysters were packed into half-pint friction-lidded glass jars which then were packed in ice. The shucking and packing operations were done in a commercial plant. The samples were delivered to the School of Fisheries, University of Washington, the same day as packed. At the School's processing laboratory, the jars were placed in storage in ice, at 34°-38° F., at 39°-45° F., and at 46°-54° F. (The center temperature of the jars averaged, over a 16-day storage period, 33° F., 36° F., 46° F., and 53° F., respectively.) Control samples were taken immediately upon receipt, and the initial pH and bacterial counts were determined.

Over the next 16 days, samples were removed from storage at specific intervals, the pH of each sample was measured, and the bacterial counts were determined.

The day following delivery of the samples, a portion of the jars from the group held in ice were removed from storage. These jars were warmed to a center temperature of 75° F. in 35 minutes, and then placed in cooling baths. One group was cooled in such a manner that the center temperature reached 50° F. at the end of $2\frac{1}{2}$ hours. A second group was cooled to a center temperature of 50° F. in four hours, and a third group was cooled to a center temperature of 50° F. in six hours. At the end of each of these intervals the pH and total bacterial count of each sample was determined.

RESULTS AND DISCUSSION

The results of the experimental work for the cooling experiment are shown in table 2.

Table 2 - Bacterial Counts on Oysters and pH Changes in Samples Cooled from 75° F. to 50° F. Over Varying Time Intervals

Class	Total Plate Count	pH 1/
	Organisms/Gram	
Control	-	5.9
$2\frac{1}{2}$ hours of cooling	2,500	6.0
4 hours of cooling	4,500	6.0
6 hours of cooling	6,000	5.8

1/ pH OF GROUND MEATS AND LIQUOR.

While the data are not conclusive, there is an indication that the longer the time required to cool the oysters, the higher the bacterial counts and the lower the pH. This can be interpreted to mean that the longer the time necessary to cool the product to the required 50° F. level, the poorer will be the condition of the product at the start of storage.

From a public health point of view, these results are of importance. If micro-organisms present in oysters double in number every two to three hours during cooling from 75° F. to 50° F. and if any of these micro-organisms are of fecal origin, then a delay in cooling or slow cooling may result in sufficient numbers of pathogenic organisms to cause the oysters to become dangerous to the consumer.

The results of the 16-day storage study are presented in figures 1 and 2.

Figure 1 presents the bacterial counts of the samples stored at the various temperatures. It can be seen that the oysters stored at 53° F. would have been classed as "rejectable" using the United States Public Health Service standards at the end of 4 days of storage. At 46° F., the samples would have been classed as "rejectable" at the end of 8 days. Those stored at 36° F. would have been classified as "acceptable" after 12 days of storage and "conditional" from 13 days on. The samples stored on ice would have been classified as "acceptable" through 15 days of storage and as "conditional" on the sixteenth day.

From this illustration, it is evident that lower temperatures of storage--approaching that of ice--are conducive to maintaining low level bacterial counts in fresh shucked oysters.

Figure 2 illustrates the changes in pH of the samples stored at different temperatures. The organoleptic boundaries are those suggested by Bordawekar (1950), who demonstrated the existence of a very close correlation between pH and organoleptic scores. The figure shows that oysters held at 53° F. passed into the "putrid" range after but three days of storage. Oysters held at 46° F. came into this range after seven days, while those at 36° F. and on ice were still edible at 16 days of storage. It can also be seen that the jars stored in ice were in the "good" range approximately five days longer than those held at 36° F., which entered into the "slightly stale" region after seven days.

While slight discrepancies between the results of the bacterial determinations and the pH-organoleptic results are noted, the correlation is so close that there is no doubt that an intimate relationship between bacterial growth and glycogen decomposition was in existence.

These slight discrepancies in the absolute storage times are not of major significance. If oysters of better or poorer initial quality, or oysters obtained from a different area or during a different season, or of a different variety had been used as the test animal, the absolute results would probably have differed from those reported above. However, the relation between quality, storage time, and temperature of storage would not change greatly, if at all.

SUMMARY

To summarize the results of the experiment: the samples held at 53° F. were unacceptable after 3 to 5 days; those held at 46° F. were unacceptable after 7 or 8 days; while those stored at 36° F. and on ice were still acceptable after 13 to 16 days of storage.

It is apparent that temperature is an important factor with respect to the rate of spoilage of fresh shucked oysters. Rapid cooling and lower temperatures (in the neighborhood of 32° F.) will prolong the storage life, while slow cooling and higher storage temperatures will be conducive to rapid spoilage and a short shelf life.

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A REVIEW OF THE SOUPFIN SHARK FISHERY OF THE PACIFIC COAST

By Lorry M. Nakatsu*

The soupfin shark of the Pacific Coast was discovered in 1883 in California and described as Galeorhinus zyopterus by Jordan and Gilbert. Clemens and Wilby refer to this species as Galeorhinus galeus (Linnaeus) 1758 but general preference appears to be given to the name Galeorhinus zyopterus.

The soupfin belongs to the Carcharinidae family. Other names used in reference to this family are Carchariidae, Galeorhinidae, Galeidae, Triakidae, and Eulamidae. The gelatinous rays of this species are highly prized by the Chinese who use them for making soup, hence the common name.

DISTRIBUTION AND BIOLOGY

The soupfin shark is found along the Pacific Coast and its range extends from Southern California to Northern British Columbia. Catch statistics appear to indicate that this species does not range far out to sea. The fishery is generally confined to waters within 100 miles from shore and usually in waters around 25 fathoms.

Very little is known regarding its movements along the coast. However, a female shark tagged six miles south of Ventura, Calif., in July 1943 was recovered at Nootka Sound, west coast of Vancouver Island, in September 1945, and this seems to indicate a coastwise movement.

The discovery that the liver of this species had a high vitamin A content, a reduction of vitamin A imports due to World War II, and an encouraging high price led to an intensive fishery. This led to numerous studies concerning biology, abundance, and vitamin yield.

The soupfin shark belongs in the Elasmobranch group of fishes, having skeletons which are wholly cartilaginous. The species is ovoviviparious. The eggs grow to the size of a golf ball, 4 to 6 centimeters (approximately $1\frac{1}{2}$ to $2\frac{1}{2}$ inches) in diameter, and are fertilized internally and hatched within the body of the parent. Ripley's study in Southern California indicated that fertilization of the eggs takes place during the spring in this area, with a gestation period of one year. By spring of the following year the pups average 28 to 37 centimeters (approximately 11 to $14\frac{1}{2}$ inches) and suggest an average length of 35 centimeters (nearly 14 inches) at birth.

Observations on embryo count from samples taken in the Santa Catalina area revealed a range of 16 to 54 fertilized eggs, with an average of 35 for female soupfins around 175 centimeters (approximately $5\frac{3}{4}$ feet) in length. The number seems to increase progressively with the size of fish, smaller females having less eggs and larger females more eggs.

The soupfin is reported to reach a length of six feet and weighs from 25 to 40 pounds. The species is carnivorous and its food depends upon the availability of other fishes. Stomach analyses have shown that in the California area sardines, midshipman (Porichthys), rockfish, squid, flatfish, herring, mackerel, sculpin, smelt, ratfish, and many other forms make up its diet. Rockfish, midshipman, flatfish, etc.,

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are bottom-living forms, whereas squid, sardines, etc., are pelagic forms. This diversity indicates that the soupfin will pursue food where available.

The species appear to be seasonal, being common at some times and not at others. Also, sex differences are noticeable in the commercial catch. Studies have shown that the catches of Northern California have been predominantly male. In Central California and in the Santa Barbara region males and females seem to occur in about equal numbers, but in the Santa Barbara region females predominate in the catches in waters less than 30 fathoms. In the San Pedro area, investigations revealed an overwhelming preponderance of females (97.8 percent), but the catches did not include any from deep water.

Young soupfin are abundant in the Southern California waters and adult females have been taken in the greatest quantity in this area. The average size of females in Southern California was larger and the percentage of mature females greater than for the rest of the State, seemingly indicating the existence of a nursery area.

In Oregon and Washington males have predominated in the commercial catches. Floater nets which make fishing possible in deeper waters have contributed the major source of shark livers since 1945. Female soupfins made up 1 percent of the landings in February 1943.

Off the coast of British Columbia, large numbers have been caught in Hecate Strait and off the west coast of Vancouver Island. The percentages of females varied from about 50 percent in November and December 1942 to about 1 percent in February 1943.

COMMERCIAL LANDINGS

Encouraged by high prices, fishing effort for soupfin sharks and dogfish increased greatly during the war. Despite this increased effort, the soupfin catches fell off drastically throughout its range, showing a decline in abundance.

In California, the landings of soupfin in 1941 and a few years thereafter composed at least half of the total shark landings. For the period 1938 to 1941 in which the greatest catches of sharks were made (species breakdown is not available), the soupfin shark is believed to have made up the bulk of the shark landings. In 1954, 770,337 pounds of shark livers with a value of $70,210 were landed, but this figure includes sharks in general.

The landing of soupfin shark livers in Oregon reached a peak in 1943 of 270,000 pounds, then rapidly declined to a low of 50,000 pounds in 1948. The landings dropped further and in 1950 were reported to be 6,470 pounds, 134 pounds in 1951, 46,590 pounds in 1952, and 4,750 pounds in 1953. The landings for this four-year period are not identified by species. In June of 1950 no Oregon boats were known to be fishing for soupfin sharks. The landings that were made seem to have consisted of sharks caught incidentally with other fishes.

The State of Washington also showed a sudden rise in soupfin shark liver landings, with a high of 415,300 pounds reported in 1943. The total landings for the four-year period 1942-1945 amounted to 1,196,546 pounds. Landings dropped precipitously in 1946 to 71,258 pounds, held fairly steady until 1949, then dropped to 1,724 pounds in 1952. In 1955, 1,229 pounds of soupfin shark livers were landed.

Similar to a trend experienced by the Pacific Coast States, British Columbia landings of soupfin shark increased tremendously during the war years. Catches dwindled sharply thereafter, although the price per pound of liver remained high for some time. The annual statistical bulletin of the Canadian Department of Fisheries reports dogfish liver landings amounted to 449 pounds in 1956, but soupfin livers are not mentioned.

The vitamin A potency of shark livers fluctuates greatly with respect to the size and sex of the fish, and the locality and time caught. Thus, the price paid for livers fluctuates greatly. The price per pound of liver remained high during the bonanza war years and for several years thereafter.

However, a rise in liver imports coupled with the introduction of synthetic vitamins comparable to those obtained from natural sources contributed to the drop in fish-liver prices, resulting in a decline of the fishery. Commercial fishermen have turned their efforts to harvesting other more profitable species of fish and the catch of sharks appears to be incidental.

SHARK FISHERY IN OTHER AREAS

Walford (1945) reports landings of Eulamia sharks related to the soupfin at San Marcos Island, Lower California. Of 36 whole specimens examined 75 percent were Eulamia lamiella; of shark carcasses on the beach 90 percent were E. lamiella, the remainder mostly hammerheads (Sphyrna diplana). The most important sharks caught in this area seem to consist of these two species which, fortunately, are two of the richest in vitamin A content.

Warfel and Clague (1950) studied the shark fishing potentialities in the Philippine Islands. They sampled 16 different species of shark but most were found to have very low vitamin A content.

Springer (1951) reports that a small shark fishery existed in the Gulf of Mexico but it has been abandoned following the decline in prices of vitamin A in 1949 and 1950.

The Anglo-American Caribbean Commission (1945) reports the existence of eight species of Eulamia which is related to the soupfin of the Pacific Coast, and these sharks are reported to have livers with high vitamin A potential.

UTILIZATION

The drop in fish-liver prices has discouraged commercial shark ventures, but it might be pointed out that sharks have been utilized commercially for other purposes. Shark hides and teeth (as a novelty item) have been in demand to some extent. There appears to be a ready market for shark fins to resident Chinese for making soup, but local markets should be investigated thoroughly first. In addition, sharks can be utilized for human food, fish meal, and fertilizer. The report of the Anglo-American Caribbean Commission discusses shark utilization, prices, and lists companies in the United States and in England dealing in shark hides.

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VACUUM PROCESS FOR REMOVAL OF MOISTURE FROM HERRING BEING CANNED

A vacuum process for removal of some of the moisture from herring that is being canned was tested on an industrial scale. A batch process employing a vacuum chamber was used, vacuum being obtained by a water-jet ejector, supplied with sea water by a centrifugal pump. A much improved firmer product can be obtained by this process.

--Annual Report of the Fisheries Council of Canada, 1954

RESEARCH DEVELOPING WAYS TO ASSURE BONELESS FISH PRODUCTS

Boneless fishery products will really be boneless if experiments being conducted by the U. S. Bureau of Commercial Fisheries at the East Boston Technological Laboratory are successful.

Up to the present time experiments made on fish sticks have proven the value of the fluoroscope in spot-checking this product for bone particles. Future experiments will include work on fish fillets and fish blocks and will also be directed at developing methods for continuous scrutiny of fish products on a commercial scale rather than on just a sample or spot-check basis. These projects will be followed by an economic study to relate fluoroscopy to the cost of production.

FIG. 1 - SETTING THE CONTROLS FOR THE X-RAY UNIT.

A truly bone-free fishery product would be much more attractive to the consumer and result in a greater utilization of fish, processors believe. At present a small percentage of bone-containing fillets get past even the most rigid inspection. It is hoped that the Bureau experiments will make it possible for the industry to detect every bone in the early stages of processing.

Research indicates that the fluoroscope will show up bones in fish blocks, fillets, or other products which are less than an inch in thickness.

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UTILIZING THE UNIQUE PROPERTIES OF FISH OILS

From time immemorial, men have braved the dangers of the deep to obtain their needed supplies of marine oils. Marine oils have traditionally been used to supply man with food, medicine, and a variety of industrial products. In many parts of the world, their importance for these uses is as great as ever; but in the United States the plentiful supply of fats and oils from other sources and the rapid development of synthetic products has diminished the need for fish oils to be used in the traditional ways.

Fish oils are known to be unique in containing a high percentage of long-chain fatty acids, with many double bonds. Most uses for which fish oils are employed, at present, do not make use of these unique properties. In many cases, they are an actual disadvantage.

The peculiar structure of fish-oil fatty acids make them potentially valuable for the manufacture of many industrial and pharmaceutical products. To develop these products, however, requires considerable research. In the meat industry, this type of research has led to the development of new byproducts which, in some instances, yield a profit far in excess of that from the sale of the meat itself.

Since 1953, the U. S. Fish and Wildlife Service has been investigating the chemistry of fish oils. From a small start at the Service's Seattle Fishery Technological Laboratory, the program has expanded to a nationwide program including contract research at various university and other laboratories. A number of different phases of the subject are being investigated.

The program includes a study of fish oil polyamino fatty acids, which should have excellent surface-active properties. These compounds have potential application as fungicides, corrosion inhibitors, detergents, and ore-flotation agents.

Another phase of the investigation is the preparation and separation of fatty alcohols made from fish oils. Why study fatty alcohols? They are extremely valuable in organic research because of the variety of other substances that can be prepared from them.

Derivatives of fish-oil fatty acids being prepared in the laboratory include alkyl halides, silicones, and quaternary ammonium salts. The alkyl halides are most important as intermediary compounds in the preparation of other potentially useful products. It is possible that a highly stable drying oil or a tough resilient copolymer may result from the production of silicones containing long-chain polyunsaturated alkyl groups. The quaternary ammonium salts have potential use in the production of disinfecting and preserving agents, detergents, fire-extinguishing foams, wetting agents, and flotation agents.

The future for fish oils thus is brightening. Research is taking advantage of their peculiarities in chemical structure and is making assets out of liabilities. By these studies, fish oils--in addition to their nutritional uses--may gain added prominence as a source material for many new industrial chemicals.

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KEEPING QUALITY AND RATE OF FREEZING OF COOKED LOBSTER MEAT

Preliminary tests on the storing of cooked meat from large deep-sea lobsters (Homarus americanus) in cans at 0° F. and at -20° F. show that lobster meat stored at -20° F. for 18 weeks was of good quality, while similar samples stored at 0° F. were of fair to barely acceptable quality. The effect of no vacuum, 14 inches of vacuum and 27 inches of vacuum on the storage life of the lobster meat at 0° and -20° F. was also studied; no significant difference in quality due to vacuum in the can could be detected.

The rate of freezing, in a blast freezer, of No. 2 cans containing one pound of lobster meat was also determined. It was found that with an air-stream velocity of 1,500 feet per minute and an air-stream temperature that decreased from -10° to

-35° F. during the freezing period, 85 minutes were required to cool the cans of lobster meat from 45° to 0° F., and an additional 15 minutes to cool the meat to -20° F. (North Atlantic Technological Laboratory, East Boston, Mass.)

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TECHNICAL NOTE NO. 41 - BACTERIAL STUDIES OF FROZEN RAW BREADED SHRIMP

ABSTRACT

THE TOTAL NUMBERS OF MICRO-ORGANISMS VARIED WIDELY IN THE FINISHED SHRIMP PRODUCTS EXAMINED AND IN THE COMPONENT RAW MATERIALS. ONLY ONE SAMPLE OF UNFROZEN RAW SHRIMP YIELDED A TOTAL COUNT OF LESS THAN 100,000 PER GRAM. THERE WERE NO SAMPLES OF FRESH OR FROZEN GREEN SHRIMP WITH COUNTS LESS THAN THIS NUMBER. BOTH BREADING AND BATTER MIXES CONTRIBUTED SIGNIFICANTLY TO THE TOTAL NUMBER OF MICRO-ORGANISMS. COAGULASE-POSITIVE STAPHYLOCOCCI WERE NOT DETECTABLE IN ANY OF THE SAMPLES PURCHASED IN FOOD STORES. IN ALL BUT ONE SAMPLE OF UNFROZEN GREEN RAW SHRIMP OBTAINED DIRECTLY FROM THE PROCESSOR, HOWEVER, COAGULASE-POSITIVE STAPHYLOCOCCI WERE PRESENT. STUDY OF THE RESULTS OF COLIFORM AND ENTEROCOCCI DETERMINATIONS REVEALED THE LATTER MAY BE THE MORE RELIABLE INDICATOR OF THE DEGREE OF SANITATION PRACTICED DURING PROCESSING. HIGH ENTEROCOCCI AND TOTAL COUNTS COUPLED WITH LOW COLIFORM COUNTS MAY INDICATE A LONG PERIOD OF FROZEN STORAGE OF THE BREADED SHRIMP PRIOR TO RETAIL SALE.

BACKGROUND

Sales of frozen raw and precooked fishery products have increased markedly in the last several years. Consumer acceptance of these products has made the development of voluntary grade standards desirable as an aid in the production and marketing of these products. The Fishery Technological Laboratory, U. S. Bureau of Commercial Fisheries, College Park, Md., is engaged in research designed to determine the various factors required for the development of such standards for a variety of frozen seafoods. The objective of one project is the investigation of microbiological procedures currently employed for the examination of foods in order to determine their suitability for use on frozen fishery products.

FIG. 1 - PREPARATION OF BREADED SHRIMP FOR USE IN BACTERIOLOGICAL STUDIES.

EXPERIMENTAL PROCEDURE

Samples of frozen raw breaded shrimp were obtained for bacteriological examination from retail sources in the College Park area as well as directly from several processors of breaded shrimp in the Brunswick, Ga., area. In addition, as soon as collected from the processors, samples of unfrozen raw shrimp, breading, and batter mixes were placed in sterile containers, frozen with dry ice, and transported to the laboratory for microbiological analysis. Wherever possible, catch data and storage histories were obtained for each sample.

For analysis, 20 grams of a sample were transferred acceptically to 180 milliliters of buffered dilution water contained in a sterilized Waring Blendor that had been chilled previously for 30 minutes in a refrigerator (American Public Health Association 1955). After the sample had been blended for 2 minutes and the resultant foam had been allowed to settle for 10 minutes, the following procedures were employed for the analyses:

PREPARATION OF DILUTIONS: From the initial 1-to-10 dilution of sample, dilutions of 1-to-1,000 and 1-to-100,000 were prepared as dilution blanks. From these, dilutions of from 1-to-10 to 1-to-100,000 were plated in triplicate in Nutrient Agar-1.5 percent NaCl (Baltimore Bilogical Laboratories). Incubation was carried out at 30° C. (86° F.), and plates containing between 30 and 300 colonies were counted after 72 hours, with the aid of a Quebec colony counter.

PREPARATION OF COLIFORM ANALYSES: Organisms of the coliform group were enumerated by use of the "Most Probable Number" (MPN) method employing five replicate tubes of Lactose Broth (Difco) in three dilutions (Hoskins 1940). The results of presumptive tests were confirmed in Brilliant Green Bile Broth (Difco). Temperature in time of incubation for both procedures was 37° C. (91° F.) for 48 hours.

PREPARATION OF ENTEROCOCCI ANALYSES: The importance of enterococci (fecal streptococci) as a more certain indicator of pollution of fish and shellfish has been demonstrated by Winter and Sandholzer (1946) and by Fellers, Gagnon, and Kiyoshi (1956). A modification of the standard MPN procedure as described by the latter authors was employed for the enumeration of this group of organisms. Three dilutions of sample were innoculated into five replicates of double-strength Azide

Table 1 - Microbial Populations of Authentic Samples of Green and of Processed Shrimp from Commercial Plants

Sample Number	Plant Number	Plant Operation	Total Count Per Gram (Thousands)	Coliforms Per Gram	Enterococci Per Gram	Coagulase-Positive Staphylococci 1/
1	A	Fresh unheaded green shrimp, packed in ice (landed 2 hours previously).	160	350	240	2/ ++
2	B	48 hours in cooler, shrimp, headed, deiced, machine-graded, manually peeled and deveined 36-40 count.	1,700	38	130	++++
3	B	48 hours or longer in cooler, shrimp, manually peeled and deveined 36-40 count.	130	22	26	±
4	B	48 hours or longer in cooler, shrimp, peeled and deveined, manual pinning operation.	980	210	>2,400	++
5	B	Batter, used all day and reinforced with fresh mixture as used.	280	1,600	540	-
6	B	Breading, used all day, sifted periodically and reinforced as used.	78	350	140	-
7	B	48 hours or longer in cooler, shrimp, peeled and deveined, stored in cooler for pinning operation.	390	3.6	170	±
8	B	Peeled and deveined, shrimp, in cooler awaiting pinning, not more than 16 hours in cooler.	480	0	1,600	+++
9	B	10-oz. pack of breaded shrimp, hand boxed, after 30-45 minutes of blast breezing.	230	49	540	+
10	B	Green shrimp, graded, peeled, deveined, 13 hours since landing.	660	4	17	±
11	B	Breading, used in #10, taken 45 minutes after preparation.	75	7.8	920	±
12	B	Batter, used in #10 taken 60 minutes after preparation.	1,900	33	>2,400	++
13	B	10-oz. pack of breaded shrimp, hand boxed, after 30-45 minutes of blast freezing, green shrimp from sample #10.	1,200	26	280	+
14	C	Green shrimp, storage history unknown, composite of several boxes of iced shrimp.	82	17	79	-
15	C	Batter, cooled storage tank, age unknown.	150	170	920	-
16	C	Breading, sample of sifted breading in use during day operation.	41	350	1,600	-
17						
18	C	10-oz. pack, breaded shrimp, hand boxed, taken from day's production using #14, 15, 16.	490	70	>2,400	±
19	D	Green shrimp, composite of unknown history.	960	20	540	++
20	D	Batter mix, unknown history.	200	11	49	-
21	D	Breading mix, unknown history.	150	0	49	-
22	D	10 oz. pack of breaded shrimp, from day's production	1,900	7.8	>2,400	++++

1/ THE TERM "STAPHYLOCOCCI" IS USED CONVENTIONALLY IN PLACE OF THE ACCEPTED NOMENCLATURE, MICROCOCCUS PYOGENES OFTEN USED AS AN INDEX OF THE QUALITY OF A PRODUCT.
2/ QUALITATIVE SYMBOLS: ++++ HEAVY GROWTH \ +++ MODERATE \ ++ LIGHT \ + FEW COLONIES \ ± ONE COLONY, NONCOAGULASE PRODUCING \ - NEGATIVE

Dextrose Broth (BBL) and incubated at 37° C. If turbidity was observed at the end of 48 hours, a large loopful was innoculated into Ethyl Violet-Azide Broth (BBL), and the tube was incubated for 48 hours at 37° C. (91° F.). The formation of a "purple button" of sodiment at the bottom of the tube was interpreted as a positive confirmed test. Microscopic examination of stained preparations of these sediments revealed gram positive cocci in chains.

PREPARATION OF STAPHYLOCOCCI ANALYSES: Qualitative detection of coagulase-positive staphylococci was carried out by streaking 0.02 milliliters of the 1-to-10 dilution on duplicate plates of Tellurite Glycine Agar (BBL) and incubating the plates at 37° C. (91° F.) for 48 to 72 hours. Zebovitz, Evans, and Niven (1955) have demonstrated that the appearance of jet black colonies is to be interpreted as a positive presumptive test. Standard coagulase tests were carried out with incubation for 1 hour at a 37° C. (91° F.) water bath, on isolates that had been propagated in Brain Heart Infusion Broth (Difco) for 16 to 18 hours at 37° C. (91° F.).

RESULTS AND DISCUSSION

Table 1 indicates that a wide range existed in total numbers of micro-organisms in the finished product and in the raw component materials. Only sample number 14 of unfrozen raw shrimp yielded a total count of less than 100,000 per gram. There were no samples of frozen raw green shrimp with counts under this number. Both breading and batter mixes contributed significantly to the total numbers of micro-organisms.

Table 2 - Analyses of Samples Obtained from Retail Sources

Sample No.	Brand	Total Count Per Gram (Thousands)	Coliforms Per Gram	Enterococci Per Gram	Coagulase-Positive Staphylococci1/
1	A	920	11	280	-
2	A	3,400	920	1,600	-
3	A	84	140	1,600	-
4	B	210	13	>2,400	-
5	B	1,000	33	>2,400	-
6	B	620	140	920	-
7	C	88	7	240	-
8	C	150	350	540	-
9	D	150	17	920	-
10	D	650	33	46	-
11	E	130	1,600	2,400	-
12	E	300	280	1,600	-
13	F	660	110	>2,400	-
14	G	700	49	79	-
15	G	30	33	>2,400	-
16	H	400	33	>2,400	-
17	J	410	79	920	-
18	K	120	220	920	-

1/THE TERM "STAPHYLOCOCCI" IS USED CONVENTIONALLY IN PLACE OF THE ACCEPTED NOMENCLATURE, MICROCOCCUS PYOGENES.

Coagulase-positive staphylococci were not detectable in any of the samples purchased in local food stores (table 2). It was impossible to determine the age of these samples, since storage histories and catch data were not available. One may only infer that this organism does not remain viable in samples subjected to prolonged frozen storage and that no information would be forthcoming from procedures designed for their detection in these samples.

In all but one sample of unfrozen raw green shrimp and in all samples of the finished frozen breaded product, received directly from the processors, coagulase-

positive staphylococci were present (table 1). It became evident that the inclusion of of coagulase-positive staphylococci in any microbiological standard for frozen raw breaded shrimp would be dependent upon whether processing plant or retail samples were examined.

Further study of the results of coliform and enterococci determinations revealed that the latter may be a more reliable indicator of the degree of sanitation practical during processing of the product. The magnitude of the total counts paralleled more closely the occurrence of greater numbers of enterococci in all of the products examined than the coliform counts. Previous work reported by Fellers et al (1956) has demonstrated that enterococci are more resistant to frozen-storage temperatures than are coliform organisms, since survival curves of the latter show a steady decrease in numbers of viable organisms with time in storage. It is possible that high enterococci and total counts coupled with low coliform counts indicate extended frozen storage of the frozen breaded shrimp prior to actual sale to the consumer.

--BY JEROME KERN, FORMERLY BACTORIOLOGIST,
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STUDIES ON THE FREE LIQUOR, SALT, AND DRY SOLIDS RELATIONSHIPS OF OYSTERS CONTINUED

With start of the oyster season in the Tidewater area of Virginia during the last week of August 1957, the College Park Fishery Technological Laboratory of the U. S. Fish and Wildlife Service has resumed the study, begun in the spring of 1957, of the interrelationship of dry solids, free liquor and salt, and the effect of variations in processing and storage conditions on these factors for oysters. Production during September has been good with ample quantities of shell oysters and fairly high yield of the shucked product for this early in the season. The study was originated to provide the industry with information needed to further improve the methods in processing oysters.

NOTE: SEE COMMERCIAL FISHERIES REVIEW, JUNE 1957, P. 15.

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California

SHRIMP INDUSTRY ATTAINS CATCH QUOTAS IN CERTAIN AREAS: For the first time in a single year, California's growing ocean shrimp industry in two areas has reached catch-limit quotas ahead of the scheduled legal closing date.

The California Department of Fish and Game announced that the shrimp fleets operating out of Bodega Bay and Fort Bragg reached their catch limits well ahead of the October 15 closing date. When the season's quotas are reached ahead of time, the Department's Marine Resources Branch explained, the operators are then given two weeks' notice before the shutdown order becomes effective, thus avoiding a sudden curtailment of their business activities.

The State's shrimp industry also operates out of Crescent City, Eureka, and Morro Bay.

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INSHORE AREAS BETWEEN SANTA CRUZ AND SAN DIEGO SURVEYED BY AIRPLANE FOR PELAGIC FISH SCHOOLS (Cessna 1359D Flight 57-5 and Cessna 3632C Flight 57-6): The inshore areas between Santa Cruz in Monterey County and San Diego were surveyed by airplanes of the California Department of Fish and Game

Table 1 - California Airplane Spotting of Fish Schools in Single Area

Time Period	Newport Beach		Laguna Beach	
	Fish Schools Observed	Area	Fish Schools Observed	Area
	No.	Sq. Ft.	No.	Sq. Ft.
12:48 p. m.-1:07	6	10,100	1	400
1:07 -1:20	14	22,500	1	100
1:42 -2:00	12	15,000	8	8,400
2:00 -2:16	13	21,000	6	16,100
2:16 -2:30	10	20,600	6	18,800
2:30 -2:45	10	15,400	5	10,600
2:45 -3:02	7	28,000	6	36,600
3:02 -3:17	8	41,300	4	22,500
4:10 -4:28 p.m.	4	5,100	5	28,700

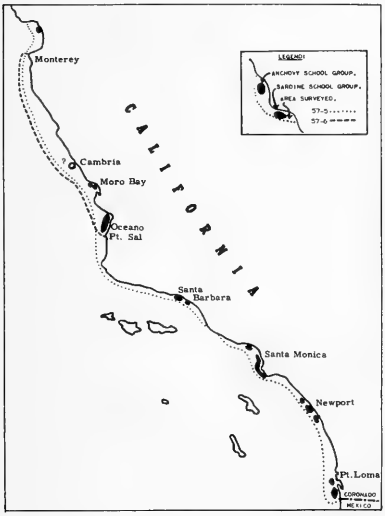
from July 25-28 (flight 57-5) and on August 6 (flight 57-6). The flights were designed to assess the abundance and distribution of schooling pelagic fish and to measure the hourly variation in the abundance of fish in a given area.

Weather conditions were poor in the area between Santa Cruz and Point Sal on the first flight so an additional flight (57-6) was conducted to adequately cover this area.

In general, sardine schools dominated the area between San Pedro and San Diego. Sardine schools were also reported by commercial fishermen to be concen-

trated in the Point Mugu and Santa Rosa-Santa Cruz Islands areas. Reports of sardines near Avila could not be confirmed by the Department's observers.

Compared to 1956 at this time, there were far fewer anchovies and Pacific mackerel. Anchovies were found in the Point Vicente-Santa Monica area, around Santa Barbara and Carpinteria, between Point Sal and Avila, and in Monterey Bay.



AIRPLANE SPOTTING FLIGHTS 57-5 (JULY 25-28) AND 57-6 (AUGUST 6).

Table 2 - Sardine and Anchovy Schools Observed in 10-Mile Sections of Coast off California

Region	Anchovy		Sardine	
	Schools	Area	Schools	Area
	No.	Sq. Ft.	No.	Sq. Ft.
Cayucos	2	36,600	0	
Morro Bay	2	11,900	0	
Avila	197	2,600,000	0	
Oceano	25	330,000	0	
Santa Barbara	31	123,500	0	
Carpinteria	13	33,800	0	
Pt. Pitas	1	200	0	
Malibu	24	104,000	0	
Santa Monica	2	5,200	0	
Redondo	18	96,700	0	
Port. Bend	34	182,700	0	
Hunt. Beach	0		9	20,000
Newport	0		8	41,300
Laguna	0		12	63,800
Pt. Loma	0		2	500
Coronado	0		46	281,500
Totals	349	3,524,600	77	407,100

The first of a proposed series of observations designed to measure hourly variations in abundance of fish in a given area was initiated on this flight. A portion of one day was spent flying over the waters between Huntington Beach and Dana Point. On each of the 15-minute flights made from 12:48 p.m. to 3:05 p.m. and 4:10 p.m. to 4:28 p.m. P.S.T. numbers of fish schools were counted and their visible area measured using an optical instrument.

The observations made on the two isolated sardine school groups found in the area, one off Newport Beach and the other off Laguna Beach, are listed in table 1.

The fish school area, as shown in table 1, is only the first step in the development of a method of estimating the density of observed schools. As yet these figures cannot be converted into a measure of absolute density such as pounds per square foot. The resolution of this problem, however, is in the planning stage.

A tally of sardine and anchovy schools and total area (square feet) of fish in each 10-mile section of the coast in which these species were observed is shown in table 2.

Cans--Shipments for Fishery Products, January-August 1957

Total shipments of metal cans during January-August 1957 amounted to 86,130 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 77,147 tons in January-August 1956. Although the shipments of cans this year exceed those of last year, the packs of some important fishery products this year through August were below the previous year. The can shipments this year indicate the

plans of canners to pack more fishery products than the previous year, but various conditions in the fisheries have hindered these plans.

NOTE: STATISTICS COVER ALL COMMERCIAL AND CAPTIVE PLANTS KNOWN TO BE PRODUCING METAL CANS. REPORTED IN BASE BOXES OF STEEL CONSUMED IN THE MANUFACTURE OF CANS, THE DATA FOR FISHERY PRODUCTS ARE CONVERTED TO TONS OF STEEL BY USING THE FACTOR: 23.0 BASE BOXES OF STEEL EQUAL ONE SHORT TON OF STEEL.

Chesapeake Bay

VIRGINIA-MARYLAND JOINT FISHERY INVESTIGATION: What fishes were in Chesapeake Bay in September? What parts of the Bay were they occupying? These and other questions were answered by scientists from the Virginia and Maryland marine laboratories late in September 1957. The Pathfinder, new Virginia Fisheries Laboratory research vessel, was accompanied by two biologists from Gloucester Point, Va., and two biologists from Solomons, Md., points out an October 1 press release from the Virginia Fisheries Laboratory.

Although Virginia and Maryland scientists have, at times, visited each other's waters to gather information about the fishes of the Bay, this was the first joint investigation. There has always been close cooperation between the biologists of the two states and it is expected that other surveys will be made jointly in the future.

Fishing was done with a trawl net, similar to that used by shrimp fishermen. The net was hauled along the bottom for 15 minutes at seven-mile intervals, from the mouth of the Bay to its northern extremity.

Commenting on the expedition, one biologist said, "Chesapeake Bay must be studied as a whole if we are to understand clearly the movement, growth, and migration of fishes. Fishes are no respecters of boundaries and biologists often find it necessary to follow them through the waters of both states.

In past years Virginia biologists have made many surveys of the Bay and the major estuaries from the ocean to fresh water. As a result, they know a great deal about the distribution and movements of fishes and other animals. On this latest cruise, they found that the pattern of fish distribution up and down the Bay is different in several respects from the distribution up and down a river like the York.

Containers

GIANT RUBBER TUBE FOR SHIPPING LIQUIDS DEVELOPED: The development of a giant rubber-fabric container which has the appearance of a huge toothpaste tube was announced by the President of a large rubber manufacturing firm during the dedication of its new research center at Wayne, N. J. This container, known as a "Sealdtank," was sponsored by another corporation for the transportation primarily of liquid products. Such a container might be of great value in the transportation of condensed fish solubles, fish oil, and even fish scrap with substantial savings in transportation costs. The giant tube may be carried on almost any kind of truck body, railroad car, or barge. It is thus possible to carry a dry cargo in one direction and a liquid cargo on the return trip. It is reported to be a simple matter to pump material into the "Sealdtank" and it may be as readily deflated. It can then be rolled up and stored out of the way. It is looked upon as one of the most significant advances in liquid transportation of the last 50 years.

Federal Aid Funds Apportioned to States

Apportionments of Federal Aid Funds to States for Sport Fishing and Wildlife, Fiscal Year 1958

State	Sport Fishing	Wildlife
	$	$
Alabama	123,648.97	338,131.27
Arizona	109,045.10	422,718.40
Arkansas	114,738.36	321,757.44
California	300,000.00	912,818.70
Colorado	137,547.15	513,589.28
Connecticut	60,000.00	95,650.00
Delaware	60,000.00	95,650.00
Florida	131,631.72	267,460.37
Georgia	107,590.53	304,236.30
Idaho	94,303.37	354,522.51
Illinois	180,867.40	525,586.81
Indiana	186,015.97	563,080.87
Iowa	111,357.08	422,784.93
Kansas	99,135.79	383,446.48
Kentucky	106,559.32	303,470.70
Louisiana	77,517.70	314,413.73
Maine	62,587.21	217,902.77
Maryland	60,000.00	130,729.21
Massachusetts	60,000.00	103,715.35
Michigan	285,922.62	956,500.00
Minnesota	300,000.00	609,305.85
Mississippi	64,757.59	268,380.56
Missouri	155,653.35	456,387.94
Montana	146,137.56	591,508.71
Nebraska	94,253.30	351,497.32
Nevada	85,938.36	370,028.11
New Hampshire	60,000.00	95,650.00
New Jersey	60,000.00	135,501.28
New Mexico	102,307.48	433,718.36
New York	174,771.47	799,621.99
North Carolina	107,991.38	393,276.05
North Dakota	62,804.32	291,221.70
Ohio	198,486.13	581,041.84
Oklahoma	131,365.44	339,833.12
Oregon	130,363.30	484,815.28
Pennsylvania	168,878.31	757,852.86
Rhode Island	60,000.00	95,650.00
South Carolina	73,427.81	198,308.96
South Dakota	79,828.14	351,689.96
Tennessee	167,908.80	436,920.95
Texas	277,255.11	956,500.00
Utah	82,437.93	361,063.89
Vermont	60,000.00	95,650.00
Virginia	100,266.39	379,537.01
Washington	127,096.13	414,828.79
West Virginia	60,000.00	257,468.11
Wisconsin	238,420.88	582,663.59
Wyoming	101,182.53	396,262.65
Hawaii	60,000.00	95,650.00

State programs for the restoration and development of sport fishing and wildlife in the 48 States will have their biggest year in fiscal year 1958 with the apportionment of $25,130,000 in Federal aid funds, Assistant Secretary of the Interior Ross Leffler announced October 13, 1957. This represents an increase of $4,068,000 over the previous high apportionment of $21,062,000 in 1957.

On the basis of one dollar from the state for every three of Federal funds, $32.5 million will be available to state conservation departments for their fish and game programs in fiscal year 1958.

The combined Federal Aid in Fish and Wildlife Restoration program is administered by the Bureau of Sport Fisheries and Wildlife of the United States Fish and Wildlife Service. The Federal Aid in Wildlife Restoration Act, approved September 2, 1937, popularly known as the Pittman-Robertson Act, was designed to help check the depletion of the Nation's wildlife and stimulate its restoration. The Federal Aid in Fish Restoration Act, or Dingell-Johnson Act, approved August 9, 1950, was enacted to help the States solve their sport-fishery problems.

Sport fishing programs will receive $6 million in 1958. Wildlife restoration projects will have $19,130,000 which includes the third 20 percent--$2,693,494--of the accumulated backlog of Federal aid funds. In 1955 the Congress authorized the appropriation, over a five-year period, of the reserve of $13,467,468 which had accumulated from 1939 to 1946 when Congress did not appropriate total receipts annually from the excise tax on sporting arms and ammunition.

The wildlife total in 1958 is an increase of $2,894,000 over last year's apportionment of $16,236,000. The amount available for sport fishery projects is $1,174,000 greater than the 1957 total of $4,826,000.

The revenue for the Federal share of the sport fish restoration program

comes from the 10-percent excise tax on fishing rods, creels, reels, artificial lures, baits, and flies as paid by the manufacturers of these products. Collections from this source during the year ended June 30, 1957, amounted to $6,404,564. From this total is taken the annual apportionments of $75,000 to Alaska, $10,000 each to Guam, Puerto Rico, and the Virgin Islands, and $299,564 to cover the administration of the Act.

To obtain the benefits of the Federal grants, the States submit project proposals to the United States Fish and Wildlife Service. Such proposals may consist of surveys, investigations, land acquisitions, land and water development, management of restoration areas, and maintenance of the completed projects. Acting for the Secretary of the Interior, the Service reviews these proposals to determine whether they are substantial in character and design, within the meaning of the Acts.

When Federal Aid projects are approved by the Service, the state fish and game departments proceed to carry out the plans, spending their own funds. The States then submit reimbursement claims for 75 percent of the costs of the project, either periodically or at the completion of the work. The remaining 25 percent of project expenditure is financed out of regular state funds. All equipment, lands, and structures become the property of the states. All project workers are hired by the states and are state employees.

NOTE: SEE COMMERCIAL FISHERIES REVIEW, NOVEMBER 1957, P. 30.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-SEPTEMBER 1957: Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 1.6 million pounds (value $48,000) of fresh and frozen fishery products were purchased in September by the Military Subsistence Market Centers. This was lower than the quantity purchased in August by 23.9 percent and 17.8 percent less than the amount purchased in the same month a year earlier. The value of the purchases this September was lower by 29.2 percent as compared with the previous month and down 14.9 percent from September a year earlier.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Market Centers, September 1957 with Comparisons

QUANTITY				VALUE			
September		Jan.-Sept.		September		Jan.-Sept.	
1957	1956	1957	1956	1957	1956	1957	1956
(1,000 Lbs.)				($1,000)			
1,610	1,958	18,715	20,232	848	997	9,682	10,105

For the first nine months of 1957 purchases totaled 18.7 million pounds, valued at $9.7 million--a decrease of 7.5 percent in quantity and 4.2 percent in value as compared with the same period of 1956.

Prices paid for fresh and frozen fishery products by the Department of Defense in September averaged 52.7 cents a pound, about 3.9 cents less than

Table 2 - Canned Fishery Products Purchased by Military Subsistence Market Centers, Sept. 1957 with Comparisons

Species	QUANTITY		
	Sept.	Jan.-Sept.	
	1957	1957	1956
	(1,000 Lbs.)		
Tuna	-	1,476	2,227
Salmon	211	1,220	601
Sardine	18	126	231

the 56.6 cents paid in August, but 1.8 cents above the 50.9 cents paid during September a year earlier.

Canned Fishery Products: Salmon and sardines were the principal canned fishery products purchased for the use of the Armed Forces during September as compared with the same period in 1956, purchases for the first nine months of 1957 of canned tuna were down 33.7 percent, of canned salmon were up 10.3 percent, and of canned sardines down 45.5 percent. Total purchases of these three canned fish items January-September 1957 were down by 7.3 percent from the like period of 1956.

NOTE: THE ARMED FORCES INSTALLATIONS GENERALLY MAKE SOME LOCAL PURCHASES NOT INCLUDED IN THE DATA GIVEN. ACTUAL TOTAL PURCHASES ARE HIGHER THAN INDICATED, BUT IT IS NOT POSSIBLE TO OBTAIN LOCAL PURCHASES.

* * * * *

OVERTIME INSPECTION BARRED ON CANNED FOODS PROCUREMENTS: Overtime for inspection of canned foods procured by the Military Subsistence Supply Agency will no longer be permitted. Canned food purchases will be inspected only five days a week, Monday through Friday, in any 8-hour cycle from 6 a.m. to 6 p.m.

The action is aimed at a reduction in Federal spending. It stems from a policy directive by the Secretary of Defense which constitutes a general prohibition on overtime in defense contracting. The policy is being implemented now by the various Defense Department buying agencies.

The Military Subsistence Supply Agency in Chicago has been instructed by the Defense Department that inspection of canned foods is to be performed without payment of overtime, and this information has been given to the canning industry by the various Market Centers, with October 10 as the effective date of this new policy. It is understood that the only exception so far allowed with respect to canned food procurement is in contracts wherein the overtime inspection will not exceed 2 percent of the labor hours of the contract and will result in a cost advantage to the government.

Purchasing officials are well aware of the difficulties created by the new policy with respect to contracts which involve inspection of "in-process" production. They suggest, however, that the new policy will have no effect on procurement of warehouse stocks because they usually are inspected on regular time. The policy is not to be construed as diminishing the requirements for Government inspection.

Films

BROILED DEVILED SARDINES.

NEW FILM ON USE AND PREPARATION OF MAINE SARDINES: The many ways in which sardines can be used and prepared by the housewife to make tasty meals, sandwiches, and snacks for the whole family are featured in the newest film "Sardines from Maine, Down-East Style." The film was previewed in Bangor, Maine, at a meeting of Maine sardine canners, the Maine Sardine Council announced on October 10.

The film, scheduled for national distribution about October 15, 1957, is in 16 mm., with full color and sound and runs for 13 minutes. It was made for the Council by a New York City firm with the technical cooperation of the United States Fish and Wildlife Service. Distribution will be handled through the film libraries of the U. S. Department of the Interior and the Maine Sardine Council.

Most of the footage was shot in Maine around the theme that sardines are good food whether eaten in the summer, fall, winter, or spring. Other scenes were made in various parts of the country.

The film opens with a brief showing of the fish harvesting and canning operations and then concentrates on the uses and preparation of Maine sardines under many conditions as well as the various types of pack, oils, and sauces.

Sail boats, stately sardine carriers, the rocky coast, autumn foliage, winter scenes, the coming of spring, the glory of summer, and a host of Down-East men, women, and children in the role of actors and actresses makes the film entertaining as well as informative.

School lunches, outdoor picnics, party snacks, hearty sandwiches, and tasty main dish meals for the family dinner are all depicted in colorful scenes.

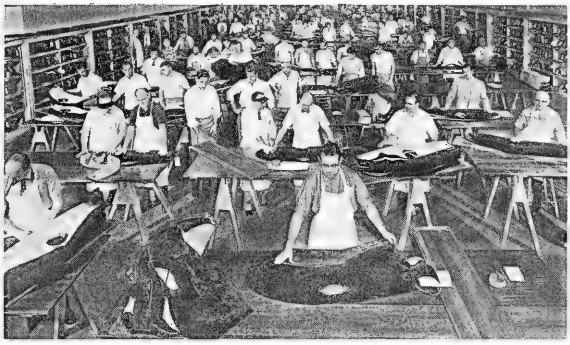
Approximately 75 prints are being made for initial distribution and others will be added to the supply from time to time. "They will supplement our many other promotional and advertising activities," the Council Chairman pointed out.

The film will be available at no cost for showings by schools, clubs, fraternal and civic organizations, and other groups and may be obtained, on a loan basis, from the United States Fish and Wildlife Service, Washington 25, D. C., or the Maine Sardine Council, 15 Grove Street, Augusta, Maine.

The Council's award-winning film, "It's the Maine Sardine," made several years ago, is still much in demand and is a very popular fisheries film distributed by the Interior Department.

Fur-Seal Skins

PRICES DECLINE AT FALL AUCTION: A substantial drop in prices of United States fur-seal skins characterized the semiannual auction of Government-owned furs held at St. Louis on October 18, 1957. A total of 28,782 skins, products of the sealing industry administered by the U. S. Department of the Interior's Bureau of Commercial Fisheries on the Pribilof Islands, brought $1,983,208. This compares with 27,819 skins sold for $2,547,182 at the April 1957 sale. The average for all skins sold for the account of the United States Government was $68.90; at the April 1957 sale it was $91.56; at the October 1956 sale it was $100.96.



FUR BUYERS EXAMINING FUR-SEAL PELTS.

The sale was well attended by United States, Canadian, and European buyers.

The Alaska skins included 9,843 black, 12,204 dyed "matara" (brown), and 6,735 of the recently-introduced new shade called "kitovi."

The kitovi skins brought an average of $73.04, a decline of 29.3 percent from the April average of $119.39. Matara skins sold for an average of $67.85, a decrease of 13.4 percent under the April average of $81.91. Black skins averaged $67.39, a decline of 16.5 percent from the April average of $88.32. Percentage changes in price are calculated on the basis of grade and shade of color.

In addition to the United States skins, 13,068 South Africa fur-seal skins were sold for private shippers and the account of the Government of the Union of South Africa at an average of $26.91, a decrease of 23 percent from the April 1957 sale. A total of 487 Uruguay fur-seal skins were sold for the Government of Uruguay at an average of $20.32; the April 1957 average was $31.04.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, MAY 1957, P. 24.

Great Lakes Fishery Investigations

OTTER-TRAWLING AND GILL-NETTING SURVEY OF EASTERN LAKE ERIE (M/V Cisco Cruise 8): The survey of fishery resources in the eastern end of Lake Erie by otter trawling and gill-netting was continued from September 24-October 8, 1957, by the Service's research vessel Cisco. The area under study was the same as that surveyed during cruise 6 (August 12-26) and the catches were about the same.

Smelt continued to dominate all catches taken from beneath the thermocline. In shallower waters bordering thermally-stratified areas (12-14 fathoms and less), there were practically no smelt except for fry. Catches of all species in the shallow areas were generally light.

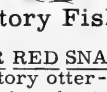
Trawling operations were carried out in 9 areas of eastern and in 2 areas of central Lake Erie. Except for smelt (up to 2,600 fry, 4,000 yearlings, and 250 adults in single 15-minute tows) and trout-perch, there were few large trawl catches of any species in the eastern area. On occasion, however, fairly large numbers of spottail shiners and small alewives were taken. Other species caught in the eastern basin include white bass, black crappie, small-mouth bass, burbot, whitefish, stonecat, sheepshead, sculpin (Cottus sp.), log-perch, sand darter, johnny darter, walleye, blue pike, and yellow perch. Smelt, mostly yearlings, made up almost the entire catches of several midwater tows made at night off Long Point.

Trawl catches in the central basin, off Ashtabula and Erie, varied from those in the east end mainly in that they contained more perch and especially sheepshead.

Experimental nylon gill nets were set in 3 areas off Erie, N. Y., and in 2 areas off Long Point, Ontario. A bottom net (several mesh sizes) in 34 fathoms off Long Point took 75 smelt and 8 coregonids. The latter were tentatively identified as lake herring, but some of them resemble Leucichthys alpenae of Lakes Michigan and Huron. Another bottom net consisting of 1,200 feet of $3\frac{1}{2}$-inch mesh was set in 16 fathoms off Erie. This net contained 6 whitefish, 8 burbot, one lake herring, and 750 smelt. A net (several mesh sizes) suspended 4 fathoms below the surface over a 9-fathom bottom off Erie caught only one perch, 2 walleyes, 2 blue pike, and 2 gizzard shad. In an oblique net set in 26 fathoms off Long Point smelt were taken at all depths. They were most abundant near the middle of the net, which was in the thermocline. Other fish in the net, all in the top half, were 1 walleye, 4 yellow perch, 1 lake herring, and 2 small alewives. An oblique net in 13 fathoms off Erie had nothing in its top 20 feet, but contained a sizable catch of smelt and large yellow perch in the bottom 60 feet.

The epilimnion in eastern Lake Erie had become thicker since cruise 6, but the thermocline was still sharp. Surface water had cooled 5°-7° C. (9°-18° F.), and ranged mostly between 17° and 18.5° C., with extremes of 15.9° C. (60.6° F.) and 19.1° C. (66.4° F.).

NOTE: SEE COMMERCIAL FISHERIES REVIEW, NOVEMBER 1957, PP. 17-20, FOR SCIENTIFIC NAMES OF SPECIES MENTIONED.

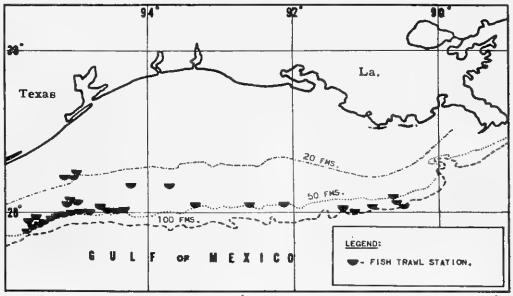


Gulf Exploratory Fishery Program

EXPERIMENTAL FISHING FOR RED SNAPPER IN GULF OF MEXICO (M/V Silver Bay Cruise 4): In an exploratory otter-trawl fishing cruise for red snapper by the Bureau of Commercial Fisheries chartered fishing vessel Silver Bay, the best results were obtained off Freeport, Texas, in an area known as "Little Campeche Bank." The cruise was made between September 19 and October 4, 1957, and includes 36 fishing stations made in 15-100 fathoms in the Gulf of Mexico off the

coasts of Louisiana and Texas. The fishing gear consisted of 5-inch mesh 60-foot and 76-foot New England-type otter trawls.

The largest single catch of 300 pounds of red snapper was made in 41-45 fathoms with the 76-foot trawl, or approximately 187 pounds per hour tow. The red snappers caught in this tow ranged from $\frac{3}{4}$ to 15 pounds, and averaged $1\frac{1}{3}$ pounds. Other catches in this area varied from 2 to 225 pounds, or about 1-113 pounds per hour tow. The highest rate of catch with the 60-foot trawl was about 120 pounds per hour tow. The 16 tows made in the area off Freeport in 41-50 fathoms yielded a total of 682 red snapper (1,058 pounds).



M/V SILVER BAY CRUISE 4 (SEPTEMBER 19-OCTOBER 4, 1957).

Nine tows were made off the Louisiana coast in 40-100 fathoms. No red snapper were caught in depths over 75 fathoms and the catches were very light in all depths. The best tow was made in 43 fathoms where a catch of 43 pounds was made in a tow of $1\frac{1}{2}$ hours.

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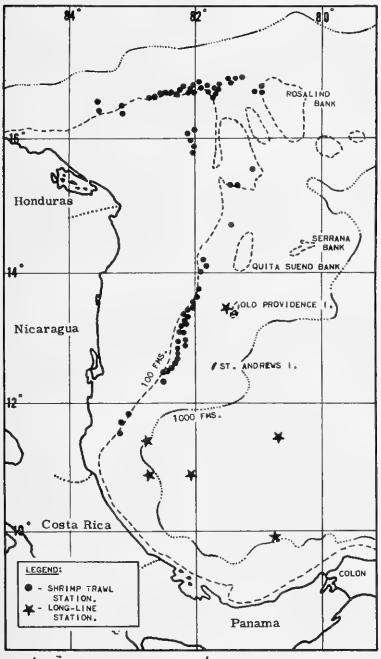


M/V OREGON CRUISE 46 (AUGUST 12-SEPTEMBER 26, 1957).

SHRIMP, TUNA, AND LIVE-BAIT EXPLORATIONS OFF CENTRAL AMERICA (M/V Oregon Cruise 46): Exploratory shrimp trawling, tuna fishing, and the determination of live-bait availability along the east coast of Central America occupied the M/V Oregon during cruise 46 (August 12-September 26.)

Six long-line sets were made south of Cabo Gracias A Dios. Two 49-basket sets made west and south of Old Providence Island yielded no tuna. Four sets off Panama and Costa Rica caught a total of 81 yellowfin tuna at rates of 2.0 to 6.9 per 100 hooks, with an average weight per fish of 110 pounds.

A total of 72 exploratory shrimp-trawling stations were made on the outer edges of the broad shelf off Honduras and Nicaragua in depths of 100 to 550 fathoms. Royal-red shrimp (Hymenopenaeus robustus) were caught in small numbers over wide areas in depths of 250 to 400 fathoms. At no time did catches exceed 15 pounds an hour. Bottom-temperature transects showed a very marked temperature decrease (58.3° to 47.5° F.), in the 200- to 300-fathom range. Catches from beyond 400 fathoms contained small numbers of very large (4-10 count heads-on) scarlet-red shrimp, Plesiopenaeus edwardsianus.

Fifteen shrimp-trawl drags were made in depths of 10 to 100 fathoms on the outer edges

of the shelf. In general, very poor trawling bottom was encountered and no species of commercial interest were caught.

Live bait for pole-and-line tuna fishing was caught with a trap-lift net at Old Providence Island, Cristobal Harbor, and Swan Island.

Several schools of blackfin and skipjack tuna were observed, but efforts to catch them by means of jack poles and chumming with live bait were uniformly unsuccessful.

Marketing

EDIBLE FISHERY PRODUCTS MARKETING PROSPECTS, THROUGH FIRST QUARTER 1958: United States civilian consumption of fishery products through next spring may average a little below the year earlier per capita rate. Slightly smaller supplies of canned and possibly frozen products are likely. Retail prices of most edible fishery items during the coming months probably will average near the high levels of a year earlier.

Commercial landings of edible fishery products are declining seasonally but will be about as large as last fall and winter. Stocks of frozen items were moderately larger this October 1 than last, but may decline below the year-earlier level as the season progresses unless imports are larger than currently anticipated. Stocks, which include imports, are the major source for frozen fishery products marketed during the winter months.

Canned fishery products may be in a little smaller supply during the next 5 or 6 months than a year earlier. The 1957 pack of canned salmon was noticeably less than last year's. Canned tuna production will likely be smaller than in 1956, but supplies in the months ahead will continue large because of heavy stocks. The pack of Maine sardines is larger this year than last. Domestic production of canned fishery products will be supplemented to some extent by imports.

Imports of fishery products during the next several months may be no higher than a year earlier. Among the frozen commodities, the import volume will depend as usual mainly on receipts from Canada. Exports of canned fish probably will be smaller than last fall and winter, depending on the pack of California sardines (pilchards) this fall.

This analysis appeared in a report prepared by the Agricultural Marketing Service, U. S. Department of Agriculture, in cooperation with the U. S. Fish and Wildlife Service, and published in the former agency's October 29, 1957, release of The National Food Situation (NFS-82).

Maryland

EFFECT OF DAMS ON LOWER SUSQUEHANNA FISH POPULATIONS TO BE STUDIED: Fish populations in the lower Susquehanna River and the upper part of Chesapeake Bay will be studied by biologists of the Maryland Department of Research and Education from the fall 1957 to the spring 1961. This important project, known as the "Susquehanna Fishery Study," was discussed at the first meeting of the Susquehanna Fishery Study Advisory Committee held at the Chesapeake Biological Laboratory, Solomons, Md., on October 14-16, 1957.

The primary objective of the project is to provide a sound biological basis for decision as to whether or not a passage, such as a fishway, should be provided for fish at Conowingo Dam. The dam is located near the confluence of the Susquehanna River and Chesapeake Bay in Maryland. A flight over the study area was made by the Advisory Committee on October 15.

The construction of a series of hydro-electric dams along the lower Susquehanna River has raised some very interesting questions concerning their effects on fish in the river. The study will deal with the kinds of fish and the numbers that reach Conowingo Dam and the estimation of the effects of passage on these fish. It will also be concerned with biological studies, population census, and the effects of the dams on young and adult fish.

Considerable data is already available at the Chesapeake Biological Laboratory about the fishery problems of this area. Creel censuses of the sport-fishing catch in 1955 and 1957, from the Maryland-Pennsylvania line to Port Deposit, have been

carried out by the Maryland Department of Research and Education in close cooperation with the Maryland Game and Inland Fish Commission. The historical aspects of migratory fish runs, especially of shad, have been documented in detail by the Department. Much data is also found in its files about the physiography of the area as well as other recorded information.

The Susquehanna River Project will be under the direction of a project leader in fishery biology. Although it will be administered by the Department of Research and Education, the Advisory Committee must approve the plans, progress, and reports of the project leader.

Mississippi River-Gulf Outlet Project

EFFECT ON FISH AND WILDLIFE CAUSES CONCERN: Concern over the effect of the Mississippi River-Gulf Outlet engineering project on the area's fish and wildlife resources has been expressed by the fishing industry, The Wildlife Management Institute, the Louisiana Wild Life and Fisheries Commission, the Gulf States Marine Fisheries Commission, and the United States Fish and Wildlife Service. As a result, a seminar was held and a four-day aerial and water reconnaissance was made of the inside waters and marsh areas of Louisiana which would be affected by this project and numerous other proposed projects. The National Fisheries Institute, the U. S. Fish and Wildlife Service, and the Louisiana Wild Life and Fisheries Commission were represented. This study, which covered almost the entire Louisiana waterfront, clearly indicated the irrevocable damage which may very well result unless immediate steps are taken to require adequate biological investigations in advance of construction of canals, dams, or other man-made devices in these estuarine waters.

The Mississippi River-Gulf Outlet was suggested many years ago. The basic plan for the project was prepared in 1946 by the Corps of Engineers. A report of the preliminary survey was submitted in 1951 by the Corps of Engineers in accordance with a request adopted in May 1943 by the Committee on Rivers and Harbors of the House of Representatives. The project was authorized finally in March 1956 by Public Law 455 (84th Congress), which was never referred to the Department of Interior for "comments and possible suggestions of amendments to provide for the conservation of fish and wildlife resources in connection with the projects." During the current fiscal year, however, the Fish and Wildlife Service will undertake investigations with funds to be transferred from the Corps of Engineers. It is hoped that a report of this study will be completed by January 1958 on an interim basis, and it is anticipated that such report will recommend modifications specifically in the interests of fish and wildlife resources.

The United States Fish and Wildlife Service has indicated concern as to the possible adverse effects of dredging and spoil deposition related to this project on shrimp and other shellfish resources in this inland sea area and on nursery values of the area for various species of finfishes. The Service is also concerned with the effects of the project on valuable waterfowl marshes. The Fish and Wild Life Commission of Louisiana adopted, at its meeting on May 28, 1957, a resolution expressing concern over the effects of the project on the fish and wildlife resources. The Commission has also suggested certain modifications in the project plans in the interest of fish and wildlife conservation. The investigations and proposals of the Fish and Wildlife Service on this project are being closely coordinated with the Louisiana Commission.

The resolution of the Louisiana Commission states in part: "In view of the progress that has been made in the planning of the New Orleans to the Gulf Tidewater Channel and in view of the fact that this agency has not been requested to officially comment on this proposed project, it is felt that the Wild Life and Fisheries Commission must make some comments and recommendations since this channel will have a pronounced effect on the fish and wildlife resources within a considerable area . . . this Commission is charged by law with the responsibility of preservation, protection, and propagation of the fish and wildlife resources of Louisiana. Therefore, pertinent factors associated with this project, as presently planned, must be pointed out . . . that portion of the proposed canal from Paris Road to Chandeleur Island will cause irreplaceable losses to fish and wildlife resources. Thus, this Commission urges strong consideration of realignment of the channel since the proposed alignment is the worst possible one for fish and wildlife resources."

The Commission sets an annual value on oysters and shrimp at $24 million ex-vessel alone and states that the value of finfishes, both commercial and sports, and waterfowl cannot be estimated.

The United States Fish and Wildlife Service stresses the importance of the brackish margin of our coast which determines the very existence of many of our most valuable fishery resources. A large project which severly modified the drainage, or which changed such properties of the water as temperature and salinity, or such features as depth, or the direction and rate of flow of currents, could have serious effect on the productivity of the area. A single small project might have only slight effect; an accumulation of several could be very damaging indeed. The Service suggests in the interest of the conservation of our food and recreational resources that every major project involving the inshore environment should be preceded and accompanied by adequate biological studies designed to determine how the project could be modified to preserve or improve the productivity of the area affected.

The proposed plan of the Division Engineer for the Mississippi River-Gulf Outlet contemplates a canal some 76 miles in length, 36 feet deep, and 500 feet wide at the bottom in a southeasterly direction from a point just east of the City of New Orleans across approximately 40 miles of marshland and thence transecting Chandeleur Sound and extending to the 38-foot level in the Gulf of Mexico, with protective jetties and a permanent retention dike across open water. The presently estimated federal cost is $92 million. Congress has just approved $375,000 for planning only and $625,000 for construction in the present fiscal year. This construction will be limited to improvements in the Intracoastal Waterway which are essential to the total project. No additional funds can be requested for construction until such time as plans for the entire project are completed.

National Fish Week

ROSS L. LEFFLER, ASSISTANT SECRETARY OF THE INTERIOR FOR FISH AND WILDLIFE BEING INTERVIEWED BY DAVE GARROWAY ON HIS "TODAY" SHOW.

TELEVISION SHOW FOCUSES ATTENTION ON 1957 FISH PARADE: In order to focus attention on the fishing industry's 1957 Fish Parade, Ross L. Leffler, Assistant Secretary of the Interior for Fish and Wildlife, appeared on Dave Garroway's "Today" Show on September 27. Leffler told the 6.5 million viewers of "Today" how the fishing industry is helping American housewives enjoy the abundance and variety of fishery products--by conservation measures, setting quality standards, and disseminating information about the nutritional and health-giving qualities of fishery products. He said also that the fishing industry is supplying ways to make fish cookery easy and delicious.

This year's National Fish Week (September 18-28) was the third such national promotion which featured advertisements in grocery, hotel, restaurant magazines, publicity in newspapers, magazines, and over radio and television. Task forces in large cities carried out local programs, with advertising and publicity in the daily newspapers and over local radio and television stations. The Fisheries Council of Canada held their Fish Parade at the same time that the United States fishing industry promoted its products.

National Tuna Week

INTERIOR DEPARTMENT SUPPORTS CANNED TUNA SALES CAMPAIGN: Another joint annual industry-Government sales promotion program designed to move the plentiful supplies of domestically-produced canned tuna into normal trade channels again had the full support of the Bureau of Commercial Fisheries, Assistant Secretary of the Interior Ross Leffler announced.

This nationwide program, publicized as "National Canned Tuna Week," was aimed at both institutional and home-consumer markets and climaxed during the 10-day period of October 31-November 9, 1957.

The Bureau of Commercial Fisheries aided the industry's promotional efforts through special work with schools, institutions, and food trade groups. Informational and educational activities were increased in order to attract greater consumer response.

Industry leaders were confident that housewives would respond to this merchandizing activity since canned tuna fits into fall menus so well and is one of the few protein foods which is now lower in price than last year at this time. National advertising by the tuna industry was expected to add tremendously to the sales effort by pinpointing special values of interest to homemakers.

The Department of Agriculture also participated in the joint campaign by lending the facilities of the Federal Extension Service and the Food Distribution and Information Divisions of the Agricultural Marketing Service. Canned tuna was included on the list of plentiful foods during October.

Nets

CARE IN CHOOSING TWINE: Has there been too much haste and too little thought in substituting new for traditional materials used in the manufacture of commercial fishing gear? This question is raised by the Technological Station of the Fisheries Research Board of Canada at Vancouver in a paper to the First International Fishing Gear Congress. This meeting was organized by the Food and Agricultural Organization (FAO) and is being held in Hamburg Germany, October 7-12, 1957.

The author of the paper, reporting on tests of cotton, linen, ramie, hemp, manryo, nylon, and terylene, points out that both new and old materials have in some instances been rejected because of inadequate tests and improper use of the twines. Illustrating this point, he cites the selection of twine sizes for salmon gill nets.

"Because fish must be caught from water, wet strength is more important than dry strength even though, for conven-

ience, many people only measure the dry strength. At one time all gill nets used to catch salmon on the British Columbia coast were made of premium-grade linen, which is about 50 percent stronger when wet than when dry. In contrast to linen, nylon decreases about 15 percent in strength when wetted; therefore, if the size of twine for a nylon gill net is chosen to give the same dry strength as has the linen gill net which it is to replace, then the nylon gill net will be little more than half as strong as the linen net when both nets are in the water."

While manufacturers of nylon gill nets are aware of this and have selected twine sizes of sufficient wet strength to carry normal fishing loads, some net men and fishermen still select nylon gill nets on the basis of hand tests applied to dry netting. The nets so chosen are too light for the loads they must carry, and are easily torn.

Another example of multifilament nylon gill nets is quoted in the paper. The knot strength is more important in fishing gear than the strength of the straight twine. Soon after nylon 66 multifilament gill nets were introduced into the British Columbia salmon fishery, nylon 6 multifilament gill nets began to appear although, when tested, it was found that nylon 6 twine was about 40 percent weaker than nylon 66 twine of the same weight. Nylon 6 was rejected as being unsatisfactory for gill nets. However, because these two nylons react differently to knotting, the mesh of a nylon 6 net is only about 20 percent weaker than the mesh of a nylon 66 net of the same weight, states the author.

The paper stresses that where materials, either new or conventional, are to be used in new applications, their physical properties should be described in an absolute manner. (Trade News of August 1957, Canadian Department of Fisheries.)

North Atlantic Fisheries Investigations

SEA SCALLOP TAGGING AND SPAWNING OBSERVATIONS (M/V Albatross III Cruise 103): In continuation of the U. S. Bureau of Commercial Fisheries studies on the Georges Bank scallop, the research vessel Albatross III made 55 drags with a scallop dredge on the eastern part of the Bank. About 12,000 scallops were examined for spawning condition and 5,500 scallops were tagged and released. In addition 300 underwater photographs were made, hydrographic data collected, and a transponding buoy tracked for six days. The vessel sailed on September 18 and returned September 26, 1957.

SERVICE'S RESEARCH VESSEL ALBATROSS III.

* * * * *

HADDOCK TAGGING AND COLLECTING CRUISE COMPLETED (Albatross III Cruise 104): A total of 1,803 haddock, 515 cod, 69 halibut, and 50 dogfish were tagged by the U. S. Bureau of Commercial Fisheries research vessel Albatross III during an October 9-20, 1957, cruise. In addition, 434 haddock less than one-year old were collected and 631 cod were examined for the presence of the copepod parasite Lernaeocera branchialis, found on the gills of cod and other species.

The area covered by the cruise included Great South Channel, a few miles east of Highland Light, Georges Bank, and Browns Bank. Fishing was conducted in 25-60 fathoms and 110 30-minute tows were made in 25-60 fathoms with a standard No. 41 otter trawl. The cod ends were lined with a $\frac{3}{4}$-inch mesh reliner to retain the catch of small fish.

The haddock were tagged with "spaghetti type" tags through the back or dorsal area, with Petersen disc tags through the operculum, and Lea internal anchor tags. Cod were tagged alternately with Petersen disc tags through the back and with Lea internal anchor tags.

North Atlantic Herring Research

DRIVING HERRING SCHOOLS WITH COMPRESSED-AIR CURTAIN: Field experiments on the driving of herring schools were conducted by Boothbay Harbor, Me., staff of the Bureau of Commercial Fisheries during the last week in August and the first nine days of September 1957. A "wall" of compressed air discharged on the sea bottom was tried in these experiments as a means of influencing the movements of herring schools. After several weeks of building and testing this gear at the Boothbay Harbor Research Station, it was taken aboard the 35-foot motorboat Clupea to Tenants Harbor for the field trials. In this area, working in cooperation with a sardine fisherman from St. George, Me., tests of the gear were made on actual schools of herring. The fisherman performed the essential task of spotting the schools from the air in his piper cub airplane and of directing the setting of the gear. All observations of the effects of the air discharge were also made by airplane. The trials were made at Pleasant Island near Tenants Harbor.

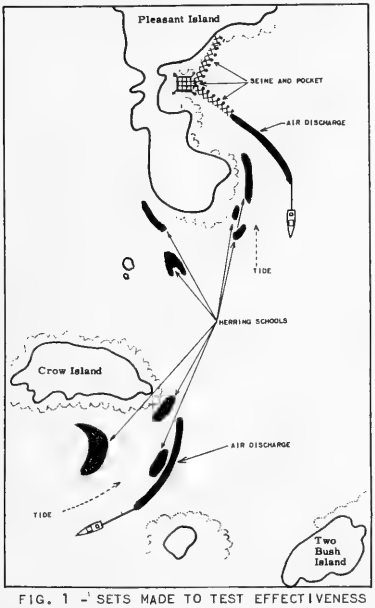


FIG. 1 - SETS MADE TO TEST EFFECTIVENESS OF COMPRESSED-AIR CURTAIN IN DRIVING HERRING SCHOOLS.

The gear used consists principally of an industrial-type air compressor, a 700-foot length of flexible polyethylene pipe with an inside diameter of 1.050 inches, and a power-driven hose reel with air fittings to allow setting out and hauling in the plastic pipe while pumping air. The compressor was capable of delivering 60 cubic feet of air a minute at a maximum pressure of 75 pounds a square inch. This compressor was connected through the hose reel to the plastic pipe--500 feet of the pipe was drilled at one-foot intervals with a $\frac{1}{32}$-inch diameter drill and weighted with a wrapping of lead wire to make it sink. An additional 200 feet of the pipe, undrilled and unweighted, was connected between the drilled piece and the hose-reel outlet.

The gear thus assembled was capable of discharging air bubbles along the 500-foot length of drilled pipe at depths of up to 100 feet. When in operation, from the pipe lying beneath the water a continuous 500-foot-long "curtain" of small air bubbles would rise to the surface.

Fish were located in suitable position for trials of the equipment during periods of favorable weather on August 31, September 1, September 8, and September 9. Sets made on these dates are shown diagramatically in figures 1 and 2. The pattern of movement of herring schools observed in this area was an approach from the south (bottom of diagram) and movement in a northerly direction toward Pleasant Island, usually going around the west side of the island.

On August 31 and September 1, part of a lead in a seine was removed from a set of commercial gear and the air-discharge pipe substituted for it as diagrammed at the top of figure 1. On August 31, the fish moved in close inshore without approaching close enough to the air discharge to give a good indication of their reaction to it. Since the fish moved along the island closer to shore than was their usual pattern, it appeared possible that the air discharge and noise of the compressor might have af-

fected their movements somewhat. On the night of September 1, the gear was put into operation as the herring schools approached, but the schools altered their usual course and swam around to the western side of the island.

On September 8, the air-discharge pipe was laid between Crow Island and Two Bush Island. On this night most of the fish veered off toward Crow Island and passed between the end of the air discharge and the island. One school, however, moved up to the air discharge and stopped there. The school remained in this position as long as sufficient light remained to allow observation.

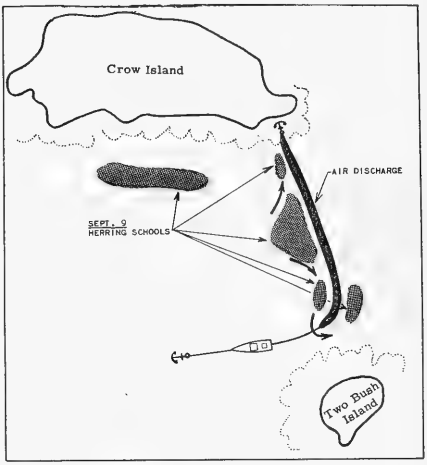


FIG. 2 - COMPRESSED-AIR CURTAIN BLOCKS OFF HERRING SCHOOLS.

In order to obtain a definite test, the channel between Crow Island and the unnamed island to the west of Two Bush Island was almost completely "blocked off" with the air discharge, as shown in figure 2, during the evening of September 9. On this night several large schools started through the channel as usual. These schools did not cross through the air discharge but stopped a short distance from it, flattened out against it, and moved along it just as they do along a length of seine. Some fish moved around each end of the air curtain but a large proportion of the school remained flattened against it for approximately the 45 minutes during which they could be observed before darkness.

In addition to these trials on "wild fish," the air curtain was tried out on herring already captured. An attempt was made to drive the fish from one pocket into another. This was not successful. The enclosed fish avoided the air until they became concentrated in approximately one half the pocket, but as they were crowded closer they began to run through it.

These experiments showed herring to definitely avoid the air curtain and resist strongly passing through it. The movements of the "wild fish" particularly were altered by the air discharge. These tests were made with the gear set in a fixed position. Additional work is in progress presently to improve the gear by making it effective over a longer length and to make it more portable. A particular problem if herring are to be driven is that of towing the plastic pipe over rough bottom. Provision has been made for adding irritant chemicals to the discharged air to make the fish avoid it, however, this has not proved necessary to date.

North Pacific Exploratory Fishery Program

EXPLORATORY FISHING CRUISE TO ALASKAN WATERS COMPLETED (M/V Tordenskjold Cruise 32): Important concentrations of Pacific ocean perch, black rockfish, shrimp, and fair quantities of king crab were found by the Bureau of Commercial Fisheries chartered schooner-trawler Tordenskjold during a five-months trip which ended October 16, 1957. The trip was planned to investigate the distribution of king crab, bottom fish, and shrimp for possible extension of known fishing grounds and their availability to commercial types of fishing gear.

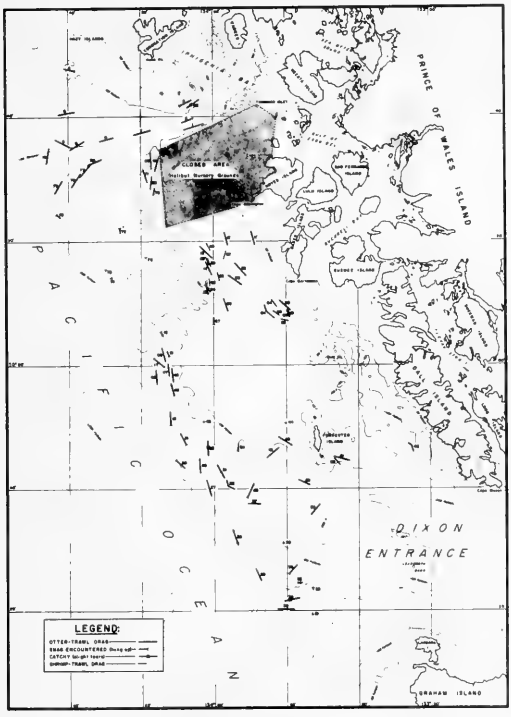


FIG. 1 - M/V TORDENSKJOLD CRUISE 32 (MAY 16-OCTOBER 16, 1957). OPERATIONS IN SOUTHEASTERN ALASKA.

Exploration in the offshore waters of Southeastern Alaska between Dixon Entrance and Hazy Islands was carried out from May 23-June 30 using standard 400-mesh Atlantic otter trawls and a 40-foot Gulf of Mexico flat shrimp trawl. Fishing efforts in this area revealed a considerable amount of clear trawling bottom and significant concentrations of Pacific ocean perch (Sebastodes alutus) and black rockfish (Sebastodes melanops). Exploration in both inshore and offshore waters of Southwestern Alaska from the Shumagin Islands to Unalaska Island was conducted from July 18-October 1. Standard king crab pots and 400-mesh Pacific otter trawls were used in this area in addition to the gear used in Southeastern Alaska. King crab were taken in fair amounts in some places, and excellent catches of shrimp were made consistently in several localities.

The exploration off Southeastern Alaska was a continuation of work initiated by the Service's exploratory fishing vessel John N. Cobb in the fall of 1956. Pacific ocean perch were caught by the Tordenskjold at depths of 87-140 fathoms at average rates of 1,000-3,150 pounds per hour in each of the following areas: in the 125-fathom gully off Timbered islet, along the 100-fathom edge offshore from Wolf Rock to Forrester Island, and on the 125-fathom bank south of Forrester Island. Average catches of 1,100 pounds of black rockfish per hour were made near the 100-fathom edge off Noyes Island. Off Cape Bartolome several half-hour drags with the Gulf shrimp trawl at depths of 82-93 fathoms caught from 130-340 pounds of small pink shrimp.

Seventy percent of the drags attempted on the Southeastern grounds came through clear. Although the other 30 percent "hung up," very little gear damage resulted. Weather conditions were generally good in sharp contrast to those experienced during the fall of 1956.

The primary objective of the exploration in Southwestern Alaska

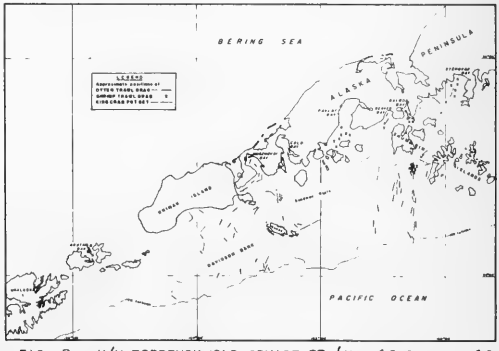


FIG. 2 - M/V TORDENSKJOLD CRUISE 32 (MAY 16-OCTOBER 16, 1957). OPERATIONS IN SOUTHWESTERN ALASKA.

was to determine the distribution of king crab outside of the known commercial fishery. Because of the large amount of area to be covered in a limited time, crab pots were normally set $\frac{1}{2}$-mile apart. Individual pots caught 15-22 crabs each on grounds south of Umga Island, north of Sanak Islands, Stepovak Bay, and in Cold Bay, Akutan Bay, and Unalaska Bay at depths ranging from 36-102 fathoms. Drags with both Eastern and Western otter trawls caught relatively small numbers of king crab. True cod was the most frequent species of bottom fish taken in the otter trawls, with 5,000 pounds caught in one 60-minute drag.

Excellent catches of shrimp (mostly "cocktail" size pinks) were made with the Gulf shrimp trawl at depths ranging from 44 to 85 fathoms in the vicinities of Sealion Rocks, Stepovak Bay, Balboa Bay, Beaver Bay, and Pavlof Bay. Drags in each of these areas produced catches averaging from 550 pounds per half hour in Stepovak Bay to 2,950 pounds per half hour at Beaver Bay. The largest single catch was 3,800 pounds taken in a half-hour drag in Beaver Bay.

A representative of the Bureau's King Crab Investigations project supervised the tagging of male king crab aboard the vessel in Southwestern Alaska. All halibut caught during the cruise were measured for the International Pacific Halibut Commission.

NOTE: SEE COMMERCIAL FISHERIES REVIEW, JUNE 1957, PP. 30-31.

Pacific Oceanic Fishery Investigations

SKIPJACK TUNA CONCOURSE AREAS SURVEY COMPLETED (John R. Manning Cruise 37): A month-long study of the distribution of skipjack tuna (aku) in Hawaiian waters was successfully completed by the Bureau's Pacific Oceanic Fishery Investigations research vessel John R. Manning on October 18, 1957. The primary objective of the cruise was to continue studies initiated last summer on a skipjack concourse near Cape Kaea, Lanai. This concourse is a small area in which, for reasons as yet unknown, the ordinarily highly mobile skipjack tuna schools appear to linger for considerable periods of time. The fishery scientists and oceanographers believe that if their study of the food and behavior of the fish and the water temperature and other environmental factors can provide them with an explanation of the almost constant presence of skipjack tuna in this one spot, they may well be able to apply this knowledge to the broader task of explaining the seasonal movements of this valuable fishery resource in and out of the Hawaiian area as a whole.

THE PACIFIC OCEANIC FISHERY INVESTIGATIONS RESEARCH VESSEL JOHN R. MANNING.

Observations made during the cruise showed that skipjack and little tuna (kawakawa) were still present in the concourse. There appeared, however, to have been some changes in the population, for a school of 11- to 17-pound skipjack was fished about 500 yards off Cape Kaea in an area where the fish have previously been predominantly about 5 pounds. Tagging of skipjack with a plastic dart tag was carried out, as on the earlier cruises, and 129 fish were successfully marked and released.

In an attempt to locate other skipjack concourses the John R. Manning surveyed areas off Halawa, Molokai; Kaena Pt., Lanai; Barking Sands, Kauai; Lehua Rock, and a shallow bank off Niihau, but no skipjack were found. At the bank east of the southern tip of Niihau, however, little tuna schools were attracted to the vessel on 3 out of 4 chumming attempts.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, NOVEMBER 1957, PP. 26 AND 27.

Oregon

SALMON TAGGING PROGRAM AT BONNEVILLE DAM COMPLETED: A total of 8,350 adult salmon were tagged at Bonneville Dam by the Oregon Fish Commission during the summer and fall of 1957 in the final phase of a 2-year study to determine what influence The Dalles Dam has had on salmon migration in the Columbia River.

A Commission biologist, directing the migration study, said the tagging phase of the investigation was completed late in September, but final results will not be known for several months. The study is being made under a U. S. Army Corps of Engineers fisheries engineering research program dealing with fisheries problems related to dam construction in the Columbia basin.

The study was designed to compare salmon migration rates before and after completion of The Dalles Dam. Migration rates of king and sockeye (blueback) salmon were obtained in 1956, before The Dalles Dam was completed, by putting numbered discs on fish at Bonneville Dam.

A portion of the tagged fish were recaptured at McNary Dam to establish the average number of days it took the fish to swim the 145 miles between Bonneville Dam and McNary Dam. This past summer, with The Dalles Dam extending entirely across the Columbia River channel, fish tagging at Bonneville Dam was repeated.

The biologist stated that "When average migration rates for tagged fish recovered at McNary Dam this year are compared with last year's figures, we should be in the position to know if the newly-constructed dam has influenced the migration rate between Bonneville and McNary Dams."

* * * * *

SOCKEYE SALMON ENTER WILLAMETTE RIVER FOR FIRST TIME: The first "run" of sockeye (blueback) salmon ever recorded in the Willamette River system was reported on October 18, 1957, by the Oregon Fish Commission. A total of 115 adult fish appeared at Dexter Dam on the middle Willamette River where the Commission collects spawning salmon blocked from their native spawning grounds above Lookout Point Dam. The superintendent of the Commission's Oakridge Hatchery said 100,000 eggs had been collected from the returning sockeye.

The adult fish are the product of 52,000 fingerlings released in the adult salmon holding pools at Dexter Dam in 1955. The fingerlings were hatched at the Oakridge Hatchery from eggs imported from a United States Fish and Wildlife Service hatchery at Leavenworth, Wash.

The returning sockeye are the second new run of fish that has come into the middle Willamette River this year. Last spring 260 mature steelhead salmon trout, also the result of fingerling plants from the Oakridge Hatchery, appeared at the Dexter holding ponds.

The acting Oregon State Fisheries Director said sockeye plantings in the middle Willamette River originally were not made with the idea of establishing a permanent run. The fish had been obtained for release in Lookout Point Reservoir to test the efficiency of an experimental fingerling attracting and trapping device. Due to a delay in the attraction experiment, the sockeye fingerlings were released below Dexter Dam, giving the fish free access to the ocean.

Adult returns from another plant of 44,000 sockeye fingerlings in the middle Willamette two years ago will be due back to Dexter Dam next summer. The survival of this group of fish will have a bearing on whether or not the Commission will attempt to establish a permanent sockeye salmon run in the stream.

Oysters

SET IN LONG ISLAND SOUND A FAILURE, SUMMER 1957: Observations on setting of oysters were discontinued at the end of September 1957. These observations, as well as information received from oystermen and other sources, show that setting of oysters during the summer of 1957 was a complete failure. For example, in Milford Bay where three collecting stations were located at depths of 10, 20, and 30 feet, respectively, only a single spat was found during the entire summer, reports Bulletin 4 dated October 4, 1957, from the U. S. Bureau of Commercial Fisheries Marine Biological Laboratory in Milford, Conn.

Examination of numerous plankton samples, collected by pumping 250 gallons of water in each case, showed in most instances almost a complete absence of oyster larvae. Thus, larvae were very scarce even though the oysters of Long Island Sound had developed normal quantities of spawn.

In comparing the intensity of setting in 1957 with that of previous years, it is clear that this year has been the poorest since the beginning of systematic studies on setting over 20 years ago. Even the set of 1938, which was previously considered the poorest, was much superior to that of 1957. Obviously, since only one spat was found on the collectors this summer, no indication of the beginning or end of the setting season, or the time of the maxima of the two waves of setting which are commonly observed in Long Island Sound, can be made.

No explanation as to why the oysters failed to set this year can be offered. A study of such environmental factors as changes in temperature, salinity, amount of precipitation, solar radiation, direction and velocity of the winds, etc., does not indicate anything that sharply distinguished this summer from certain previous ones when good sets of oysters were obtained. However, judging by the scarcity of oyster larvae in the plankton samples, it is possible that their mortality and therefore, the lack of set, was caused by a lack of food or by epidemic diseases. As has already been pointed out in many publications originating from the Laboratory, oyster larvae are extremely selective in their foods, being unable to utilize most of the microscopic forms which not so long ago were considered to be larval food organisms. Mortality of larvae due to diseases has also been observed at the laboratory on numerous occasions.

Two other possibilities are mentioned in connection with mortality of larvae; first, that the larvae were eaten by their enemies, which would also consist principally of planktonic forms. However, examination of plankton samples showed that such forms were not abundant enough to exterminate the majority of the larvae. The second possibility is that "unhealthy" conditions of the sea water, which are still not well understood, caused the larvae to die. Service biologists have found, as have their colleagues in England and in Japan, that some dissolved substances can profoundly affect the development of eggs of marine animals and the survival of larvae. The Milford Laboratory hopes to gain a better understanding of these "water factors" by using chemical approaches and methods of bioassay.

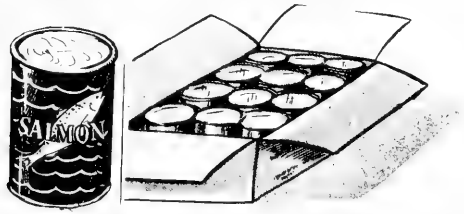
In connection with the failure of setting this year it was pointed out to the oystermen that good oyster sets in open waters along the Connecticut shore are quite uncommon. The records of the state shellfish authorities, several leading oyster companies of the state, which have been operating since the turn of the century, and Service observations fully support this contention. These records show that between 1904 and 1925, a period of 21 years, not a single general heavy set occurred in the Sound. Since 1925 good sets have occurred on only five occasions, i.e., 1930, 1939, 1940, 1944, and 1945. Thus, during the last 57 years only 6 or 7 good general sets have occurred. The remaining years have been comparative failures; years during which a general but light set occurred in the Sound, or years when good sets occurred in some sections, but in other areas setting was a failure. For example, in 1953 only the Bridgeport area had a good set, while the Milford and New Haven sections suffered near-failures.

Previous reports from the Laboratory have indicated that the open Long Island Sound is not only unreliable for obtaining a regular set, but also that control of enemies of spat and young oysters there will always remain difficult and expensive. Finally, during the last decade the oyster beds of the open Sound have suffered greatly from severe storms and hurricanes. These factors should, obviously, be considered in connection with the cultivation of oysters in deep or open waters.

Because of the above considerations, Service biologists have suggested that the Connecticut oyster growers consider the possibility of transferring part of their seed-oyster production operations from the open Sound to more shallow, better protected waters, where oysters set more regularly and where control of enemies is more feasible. This could be achieved if the natural oyster growers and oyster planters of Connecticut would combine their efforts to utilize efficiently the numerous bays, harbors, and mouths of rivers where, in the past, extensive natural oyster beds existed but which, at present, are barren and unproductive because of overfishing and a lack of cultivation. If oyster-producing areas are re-established in such inshore waters, the industry may be assured of getting commercially-important sets more often than in open waters. Furthermore, under these conditions control of the chief oyster enemies, drills and starfish, would probably not be needed at all because these pests, which require water of comparatively high salinity, are not able to exist in inshore areas where the salinity is often temporarily reduced after heavy rains.

Salmon

ALASKA'S 1957 PACK OF CANNED SALMON: Preliminary figures indicate a pack of 2.4 million cases (48 1-lb. cans) for all of Alaska, a decline of 18 percent or over 500,000 cases from 1956, and only 2.7 percent higher than the 1955 pack. The 1955 pack was the lowest in over 50 years.



The pack of pink salmon in Southeastern and Central Alaska was below expectations with the pack of this species 36.2 percent below the 1956 pack of 1.2 million cases and 40.5 percent under the 1955-cycle year pack of 1.2 million cases. The pack of reds was normal, although 24.8 percent below the 1956 pack (1956 was a cycle year). The only encouraging feature of this year's Alaska salmon pack was the substantial pack of chum salmon which exceeded the 1956 pack by 137,000 cases and was 13.2 percent or 96,000 cases above the 1954 cycle year pack.

Table 1 - Alaska's Canned Salmon Pack by Species and Area, 1954-57

Species	1957 1/				1956				1955	1954
	Southeastern	Central	Western	Total	Southeastern	Central	Western	Total	Total	Total
	(Standard Cases of 48 1-Lb. Cans)									
King	1,358	15,722	29,150	46,230	1,272	21,212	23,767	46,251	47,818	51,373
Red	82,512	179,986	484,498	746,996	72,851	341,030	579,761	993,642	621,644	1,006,951
Pink	404,221	331,873	2	736,096	634,272	516,140	3,918	1,154,330	1,237,465	1,136,792
Chum	364,756	432,797	31,142	828,695	294,282	365,091	32,197	691,570	363,634	732,338
Silver or coho	57,547	28,282	5,078	90,907	46,497	49,015	4,388	99,900	114,584	167,299
Total	910,394	988,660	549,870	2,448,924	1,049,174	1,292,488	644,031	2,985,693	2,385,145	3,094,753

1/PRELIMINARY DATA.

NOTE: SEE COMMERCIAL FISHERIES REVIEW, DECEMBER 1956, P. 49.

School Lunch Fish-Cookery Demonstrations

Home economists assisted by the fishery marketing specialists of the U. S. Bureau of Commercial Fisheries will present 92 fish-cookery demonstrations in 11 states and the District of Columbia this winter and spring.

A U. S. BUREAU OF COMMERCIAL FISHERIES HOME ECONOMIST CONDUCTING A FISH-COOKERY DEMONSTRATION BEFORE SCHOOL-LUNCH SUPERVISORY PERSONNEL.

Demonstrations will be given mainly for school-lunch and Extension Service personnel. The home economists will present the proper preparation of appetizing, economical, nutritious, and easy-to-prepare fish and shellfish dishes. The recipes to be used in these demonstrations were developed in the Bureau's test kitchens at College Park, Md., and Seattle, Wash.

Special attention is given when developing the school-lunch recipes to provide 2 ounces of cooked protein per serving to meet the Type A school-lunch requirements. The fish used in these recipes are plentiful and inexpensive. They are frozen fillets and portion fish such as cod, haddock, and ocean perch; canned fish such as mackerel and tuna; and precooked fish such as frozen fish sticks.

The demonstrations for the Extension Service are usually given to group leaders who, in turn, give similar demonstrations to their local groups. The recipes used in these demonstrations are taken from the Test Kitchen Series. The home economists usually present six recipes featuring the varieties of fish and shellfish available in local markets.

To date, the Bureau has scheduled demonstrations in the following states: New York 37, Idaho 11, Colorado 8, Iowa 8, Rhode Island 8, Oregon 5, Nevada 4, Maryland 3, Ohio 3, Utah 3, West Virginia 1, and District of Columbia 1.

South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, JULY-SEPTEMBER 1957: Oyster Research: An experimental shipment of commercial seed oysters has been made from South Carolina to northern waters. Late reports from the Chesapeake Bay area indicates that these oysters are growing and thriving. Apparently they suffered little mortality in being transplanted. Success of this shipment augurs well for this new seed oyster industry, points out Progress Report No. 33 (July-September 1957) of the Bears Bluff Laboratories.

In connection with the expansion of the seed oyster industry, studies have been continued on a substitute shell which can be used as cultch. This possible substitute is found in old dead oyster shells thrown up on banks of many creeks and rivers by wave action and stormy seas. Test planting of this shell in different years and at different times of the year show that washed shell is not particularly valuable as cultch when planted on oyster beds, but is suited for seed oyster production in suspended trays, bags, and baskets.

The amount of washed shell available in South Carolina is unmeasured, but in one stretch of the North Edisto River alone there is an estimated half-million bushels of shell. This is a "renewable resource" in that every period of bad weather washes new shells up on the banks.

With funds provided by a recent grant from the Charleston Scientific and Cultural Educational Foundation, a one-acre experimental pond at Bears Bluff has been partially cleaned of accumulated silt, and a part of its floor has been shelled and hardened for experimental planting. A portion of this oyster pond has been planted with seed oysters.

The necessary engineering work for the control of salinity is well under way with the purchase and installation of pipe lines for the transfer of fresh water. The mechanical work on one pump was completed, and a gasoline motor to be used in pumping was completely overhauled.

Just as ten years ago when similar experiments were started, the depredation of young seed oysters by crabs is great. However, unlike the situation of ten years ago, the facilities and measures for controlling these crabs are now at hand. It is hoped that control measures can be actively undertaken in the next quarter.

Shrimp Research: Sampling and analysis of the shrimp catch at the regular established stations by experimental trawl hauls was continued. In all, 88 experimental tows were made and analyzed.

A concerted effort has been made this season to arrive at some practical means by which the future commercial catch of shrimp could be predicted on the availability of young shrimp in the marshes. To date the studies look promising but are not sufficient to draw conclusions.

Pond Cultivation of Shrimp: Experimental studies on the cultivation of shrimp in ponds has been continued. Up to now, all information on pond cultivation of shrimp has been obtained from the one-acre ponds which could be flooded or drained by tidal action. Since so many requests for information come from areas where tidal magnitude is slight, two new ponds have been constructed on high land above the influence of tide. These ponds are filled by irrigation pumps. Cost analyses on operation, stocking and management, production figures, feeding experiments, growth rates, and mortality of shrimp in these ponds is being studied. A small amount of seed oysters have been planted in one of the ponds.

□□□□□□

Task Force to Study Handling of Frozen Foods

A 15-man task force to explore improved handling of frozen foods from packer to consumer has been named by the National Association of Frozen Food Packers in Washington, D. C.

The Association President and Chairman of the Task Force said that acceptance of appointments was 100 percent, indicating that "everyone who has a stake in frozen foods is aware that mishandling does exist, that it is having a detrimental effect on industry expansion, and that it can be eliminated."

The force's objectives are: "to impress upon all handlers of frozen foods the downgrading effects which exposure to temperatures above zero have upon the products" and "inform and educate, by every means available, on proper handling methods."

The program was begun after a release by the U. S. Department of Agriculture's Western Utilization Branch on the effects of poor handling on color, flavor, texture, and nutritional value of frozen foods.

All phases of frozen food processing, distribution, and marketing are represented on the task force. The fishing industry is represented by the President of the National Fisheries Institute. (Food Field Reporter, September 16, 1957.)

United States Fishing Fleet[1/] Additions

JULY 1957: First documents as fishing craft were issued to 76 vessels of 5 net tons and over during July 1957. Compared with the same month in 1956, this was an increase of 8 vessels. The Gulf area led with 20 vessels, followed by the South Atlantic area with 16, the Pacific 14, and the Chesapeake and Alaska with 9 each. The remaining 8 vessels were credited to the Middle Atlantic and New England areas and Puerto Rico.

Table 1 - U. S. Vessels Issued First Documents As Fishing Craft by Areas, July 1957 with Comparisons

Area	July		Jan.-July		Total
	1957	1956	1957	1956	1956
	(Number)				
New England	2	1	14	10	15
Middle Atlantic	5	4	20	19	26
Chesapeake	9	23	60	66	138
South Atlantic	16	12	71	61	119
Gulf	20	10	85	65	100
Pacific	14	14	79	62	76
Great Lakes	-	-	4	2	6
Alaska	9	4	36	31	40
Hawaii	-	-	-	1	1
Puerto Rico	1	-	1	-	-
Total	76	68	370	317	521

NOTE: VESSELS HAVE BEEN ASSIGNED TO THE VARIOUS SECTIONS ON THE BASIS OF THEIR HOME PORTS.

Table 2 - U. S. Vessels Issued First Documents As Fishing Craft, by Tonnage, July 1957

Net Tons	Number
5 to 9	38
10 to 19	13
20 to 29	6
30 to 39	13
40 to 49	1
50 to 59	1
60 to 69	1
130 to 139	1
180 to 189	1
380 to 389	1
Total	76

1/ INCLUDES BOTH COMMERCIAL AND SPORT FISHING CRAFT.

United States Fishery Landings in 1957 Still Below 1956

The United States and Alaska catch of fish and shellfish for the first eight months of 1957 was running considerably below that reported for the same period of the previous year. Fisheries which this year yielded approximately 2.7 billion pounds, last year yielded nearly 3.1 billion pounds.

The greatest decline occurred in the menhaden catch which during the first eight months of 1957 totaled 1.2 billion pounds--nearly 403 million pounds less than in the same period of 1956. On the Pacific Coast, catches of tuna and tunalike fishes declined nearly 33 million pounds and Alaska salmon landings dropped 47 million pounds below 1956. Landings of ocean perch on the Atlantic Coast declined nearly 21 million pounds.

Compared with the same period in 1956, the landings of only three species increased during the first 8 months of 1957--the herring catch in Maine was up almost 29 million pounds, the herring catch in Alaska increased nearly 11 million pounds, and landings of whiting in New England increased nearly 32 million pounds.

It is evident from the information reported to date that the 1957 catch will be considerably lower than the record 5.2 billion pounds landed by United States and Alaska fishermen in 1956.

United States Catch of Fishery Products, Various Periods, 1957 and 1956 1/

Item	Period	1957	1956	Total 12 Mos. 1956
		(1,000 Lbs.)		
Maine	7 mos.	165,203	140,415	277,822
Massachusetts:				
Boston	8 mos.	97,458	103,811	147,402
Gloucester	8 "	177,550	187,505	252,038
New Bedford	8 "	66,312	60,089	87,965
Provincetown	8 "	16,279	13,754	21,151
Total		357,599	365,159	508,556
Rhode Island 2/	7 mos.	73,254	73,556	129,406
New York 2/	7 "	26,532	22,714	38,268
New Jersey 2/	7 "	30,999	29,920	46,097
North Carolina 2/	8 "	39,867	36,518	49,009
Georgia	7 "	8,432	7,402	16,711
Florida 2/	7 "	73,294	75,273	142,493
Alabama	7 "	6,505	6,341	12,320
Mississippi 2/	6 "	9,914	9,491	22,573
Texas 2/	8 "	44,453	33,406	61,993
Ohio (Mar.-Aug.)	8 "	18,773	18,038	24,928
Oregon	6 "	26,359	25,766	59,256
California:				
Certain species 3/	7 mos.	261,704	295,312	604,218
Other	5 "	45,189	37,823	156,116
Total California		306,893	333,135	760,334
Rhode Island, Middle Atlantic, Chesapeake, South Atlantic, and Gulf States (menhaden only)	7 mos.	1,131,848	1,489,724	2,010,393
Louisiana, shrimp (heads-on)	6 mos.	13,833	17,741	50,541
Washington (halibut only 4/)	8 mos.	13,887	11,921	16,604
Alaska:				
Halibut 4/	8 "	19,672	21,592	33,076
Herring (season)	8 "	114,664	103,759	103,759
Salmon	8 "	204,000	251,000	263,896
Total of all above items		2,685,981	3,072,871	4,628,035
Other (not included)		5/	5/	571,965
Grand Total		2,685,981	3,072,871	5,200,000

1/ Preliminary.
2/ Excluding menhaden.
3/ Includes catch of: anchovies, jack and Pacific mackerel, tuna and bonito, and squid.
4/ Dressed weight.
5/ Not included.
Note: Round or "as caught" weight unless otherwise indicated.

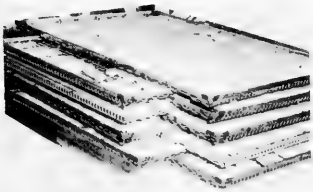
United States Catch of Certain Species, Various Periods, 1957 and 1956 1/

Item	Period	1957	1956	Total 12 Mos. 1956
		(1,000 Lbs.)		
Anchovies, California	7 mos.	39,628	36,108	54,282
Cod:				
Maine	7 mos.	1,514	1,810	2,361
Boston	8 "	13,942	14,104	17,518
Gloucester	8 "	1,264	1,034	1,361
Total cod		16,720	16,948	21,240
Haddock:				
Maine	7 mos.	2,626	2,813	4,340
Boston	8 "	70,015	76,132	106,662
Gloucester	8 "	5,709	6,648	8,774
Total haddock		78,350	85,593	119,776
Halibut 2/:				
Washington	8 mos.	13,887	11,921	16,604
Alaska	8 "	19,672	21,592	33,076
Total halibut		33,559	33,513	49,680
Herring:				
Maine	7 mos.	88,678	60,113	140,472
Alaska (season)	8 "	114,664	103,759	103,759
Mackerel, California:				
Jack	7 mos.	36,722	36,706	76,784
Pacific	7 "	9,702	14,486	47,766
Menhaden	8 mos.	1,150,403	1,553,228	2,076,588
Ocean perch:				
Maine	7 mos.	35,831	40,857	64,967
Boston	8 "	2,629	1,905	2,839
Gloucester	8 "	44,750	61,198	83,303
Total ocean perch		83,210	103,960	151,109
Salmon, Alaska	8 mos.	204,000	251,000	263,896
Scallops, sea, New Bedford	8 "	11,097	9,756	14,243
Shrimp (heads-on)	6 "	62,209	63,945	183,862
Squid, California	7 "	9,842	9,588	15,790
Tuna and bonito, California	7 "	165,810	198,424	409,596
Whiting:				
Maine	7 mos.	14,014	11,326	14,835
Boston	8 "	887	150	413
Gloucester	8 "	62,051	33,914	46,432
Total whiting		76,952	45,390	61,680
Total of all above items		2,181,546	2,622,517	3,790,523
Other 3/ (not included)		504,435	450,354	1,409,477
Grand Total		2,685,981	3,072,871	5,200,000

1/ Preliminary.
2/ Dressed weight.
3/ Partial data.
Note: Round or "as caught" weight unless otherwise indicated.

U. S. Fish Stick Production

JULY-SEPTEMBER 1957: Production of fish sticks in the United States during the third quarter of 1957 totaled 13.3 million pounds. This was 17 percent greater than for the third quarter of 1956. Over 2 million pounds more cooked fish sticks were produced in this period than in the same period in 1956, while raw fish sticks declined around 150,000 pounds.



TRAYS OF COOKED FISH STICKS IN GLOUCESTER, MASS., PLANT READY FOR THE PACKING TABLE.

Table 1 - U. S. Production of Fish Sticks, July-September 1957

Month	Cooked	Raw	Total
	(1,000 Lbs.)		
July	3,372	400	3,772
August	4,119	504	4,623
September	4,317	582	4,899
Total 3rd quarter 1957	11,808	1,486	13,294
Total 3rd quarter 1956	9,759	1,645	11,404
Total first 9 months 1957	35,101	4,294	39,395
Total first 9 months 1956	34,098	4,797	38,895

Production in the Atlantic Coast States accounted for 83 percent of the total while the Interior and Gulf States and the Pacific Coast States accounted for the remaining 17 percent.

Table 2 - U. S. Production of Fish Sticks by Areas, July-September 1957-1956

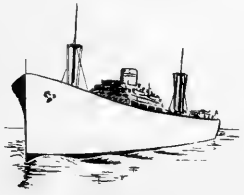
Area	July-September			
	1957		1956	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic	23	11,001	23	9,454
Interior & Gulf States	4	1,217	5	1,250
Pacific Coast States	11	1,076	10	836
Total	38	13,294	38	11,540

During the first 9 months of 1957, a total of 39.4 million pounds of fish sticks was produced as compared with 38.9 million pounds for the like period in 1956. The peak production month in 1957 was February when 5.3 million pounds were reported. March, April, and May production was down, but since June production has shown an upward trend.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, SEPTEMBER 1957, P. 48.

U. S. Foreign Trade

GROUNDFISH FILLET IMPORTS, SEPTEMBER 1957: During September 1957, imports of groundfish (including ocean perch) fillets and blocks amounted to 8.8 million pounds. Compared with the same month of last year, this was a decrease of 295,000 pounds (3 percent). The principal cause for this drop was a 1.1 million-pound decrease in imports from Iceland.



Canada led all other countries exporting groundfish fillets to the United States in September 1957 with 7.0 million pounds (a gain of 913,000 pounds). As compared with September 1956, imports in September 1957 from the Netherlands and Miquelon and St. Pierre showed a net increase of 70,000 pounds; Norway, Denmark, and West Germany shipped 187,000 pounds less.

Imports of groundfish fillets and blocks into the United States during the first nine months of 1957 totaled 106.4 million pounds--an increase of 3.4 million pounds (3 percent) as compared with the corresponding period of 1956. Canada shipped 75 percent of the total imports during the 1957 period, followed by Iceland with 17 percent, while Norway and Denmark together supplied 6 percent. The remaining 2 percent was supplied by the Netherlands, France, West Germany, Greenland, and Miquelon and St. Pierre.

NOTE: SEE CHART 7 IN THIS ISSUE.

* * * * *

EDIBLE FISHERY PRODUCTS, AUGUST 1957: United States imports of edible fresh, frozen, and processed fish and shellfish in August 1957 were lower by 1.6 percent in quantity and 7.4 percent in value as compared with the previous month. Compared with August 1956, the imports for this August were up 16.9 percent in quantity and 6.3 percent in value. Imports in August this year were higher than in July for canned salmon and raw tuna, but these gains failed to offset lower imports of fillets and blocks, canned sardines, and spiny lobster tails. Compared with the same month in 1956, imports this August were substantially greater for fillets and blocks, canned salmon, and raw tuna. These increases more than offset declines in the imports of shrimp (about 1 million pounds) and slightly lower imports of a few other items.

Imports for August 1957 averaged 27.2 cents a pound as compared with 29.9 cents a pound for the same month of 1956.

Exports of processed fish and shellfish in August 1957 rose 46.3 percent above the previous month and were up 19.6 percent above the same month in 1956. The August 1957 value of these exports was up 110 percent over the previous month and 90.9 percent higher than in the same month in 1956.

Table 1 - United States Foreign Trade in Edible Fishery Products, August 1957 with Comparisons

Item	Quantity			Value		
	August		Year	August		Year
	1957	1956	1956	1957	1956	1956
	(Millions of Lbs.)			(Millions of $)		
Imports:						
Fish & shellfish: Fresh, frozen & processed 1/	87.5	74.8	786.6	23.8	22.4	231.6
Exports:						
Fish & shellfish: Processed 1/ only (excluding fresh and frozen)	5.7	4.8	82.8	2.1	1.1	19.2

1/ INCLUDES PASTES, SAUCES, CLAM CHOWDER AND JUICE, AND OTHER SPECIALTIES.

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA PROVISO: The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1957 at the 12½-percent rate of duty is limited to 44,528,533 pounds. Any imports in excess of that quantity will be dutiable at 25 percent ad valorem.

Imports under the quota from January 1-September 28, 1957, amounted to 30,034,996 pounds, according to data compiled by the Bureau of the Customs. This leaves a balance of 14,493,537 pounds of the quota which may be imported during the balance of 1957 at the 12½-percent rate of duty.

Use of Term "Brevis Red Tide" for "Red Tide"

The association of Gymnodinium brevis with the sporadic mass mortality of fish and other marine animals occurring in the Gulf of Mexico since 1947 is fairly well established. Further, investigation in the laboratory has demonstrated that this dinoflagellate in pure culture is toxic to fish. On the basis of this evidence, it has been proposed that the name "brevis red tide" be used for such mortalities instead of the nonspecific term "red tide," which is used commonly in popular and scientific writing. (The Progressive Fish-Culturist, October 1957.)

Utilization of Fish Waste in Northern Oregon for Mink Feed

A challenging problem often met in the fishing industry is how best to utilize fish waste. One solution to this problem has been to convert the waste into feed for fur animals, such as mink.

FIG. 1 - PLANTS PRODUCING MINK FEED ARE LARGE IN ORDER TO PROVIDE AMPLE FROZEN-STORAGE FACILITIES. THIS IS A TYPICAL ONE.

During the last decade, this use has become particularly important in Washington, Oregon, and Northern California, where a substantial fur-farming industry has developed as a result of the availability of fish waste in those areas. In fact, not only the waste but also certain of the noncommercial species of whole fish are being used where state laws permit, as in Oregon (table 1).

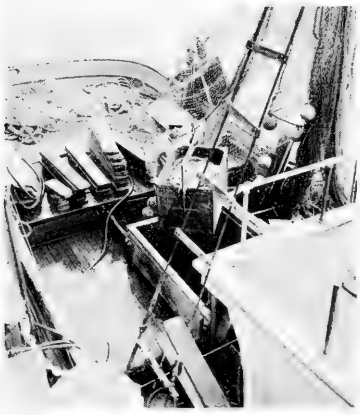
Table 1 - Amount of Fish Available for Mink Food in Oregon[1]/

Year	Fillet Scrap	Whole Fish	Total
	(Millions of Pounds)		
1956	7.2	14.1	21.3
1955	6.3	10.9	17.2
1954	7.2	6.2	13.4
1953	6.2	5.0	11.2
1952	12.8	2.0	14.8
1951	13.2	2.0	15.2
1950	12.1	2.0	14.1
1949	9.6	4.5	14.1
1948	12.1	3.3	15.4
1947	8.5	2.8	11.3
1946	15.3	Unknown	Unknown
1945	15.6	Unknown	Unknown

1/DATA COMPILED BY DR. GEORGE Y. HARRY, JR. AND WALTER G. JONES, AND MADE AVAILABLE THROUGH THE COURTESY OF ALFRED R. MORGAN, AQUATIC BIOLOGIST, FISH COMMISSION OF OREGON.

FIG. 2 - DOCK FOR UNLOADING WHOLE FISH.

Not all fish waste can be used for feeding mink. The waste must be strictly fresh, just as with fish used for human food. It must be relatively free of thiaminase, as otherwise the mink may get Chastex paralysis. And it must not be too oily, since a high content of oil is said to cause yellow-fat disease, especially if the oil is highly unsaturated.



The manufacture of waste into mink feed varies somewhat from one locality to another. In the cities of Astoria and Newport, Ore., the process is essentially one of grinding the waste, placing it in paper bags, freezing the bags with the waste, and holding them in frozen storage until needed. If whole fish are used, the process is the same except that the fish are washed thoroughly before they are ground. The photographs show the various steps in the process.

FIG. 3 - UNLOADING FISH FROM DRAGGER. ON THIS PARTICULAR TRIP, ONLY 20,000 POUNDS OF FISH WERE CAUGHT, OWING TO ROUGH WEATHER. THIS VESSEL HAS A 17-FOOT BEAM AND A LENGTH OF 58-FEET. BEING A COMBINATION BOAT, IT CAN BE USED FOR DRAGGING, TROLLING (FOR BOTH SALMON AND TUNA), AND FOR HALIBUT FISHING. NOTE THE DECK HOSE USED FOR CLEANING THE PEN BOARDS. ABSOLUTE CLEANLINESS IS ESSENTIAL TO THE DELIVERY OF QUALITY FISH.

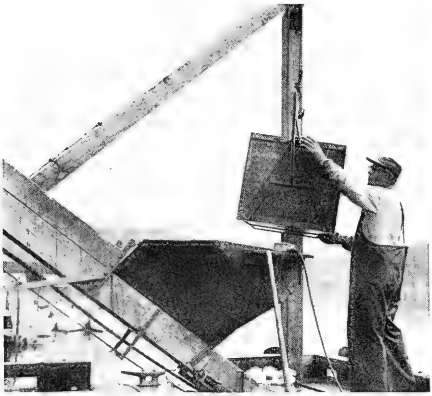


FIG. 4 - PUTTING FISH IN THE HOPPER FOR A CONVEYOR SYSTEM.

FIG. 5 - WASHING FISH.

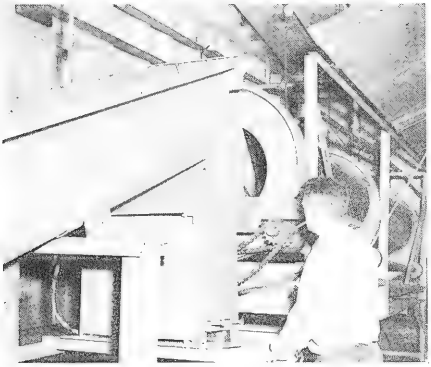


FIG. 6 - FISH WASHER.

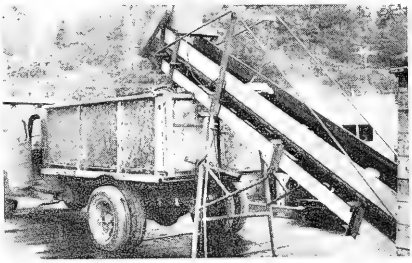


FIG. 7 - LOADING FISH INTO TRUCK.

FIG. 8 - WASHING EQUIPMENT. METICULOUS CARE MUST BE TAKEN TO ENSURE THE CLEANLINESS OF THE EQUIPMENT.

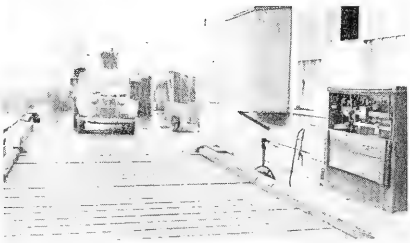


FIG. 9 - SCALE (40,000-POUND CAPACITY) FOR WEIGHING FISH.

FIG. 10 - UNLOADING TRUCK.

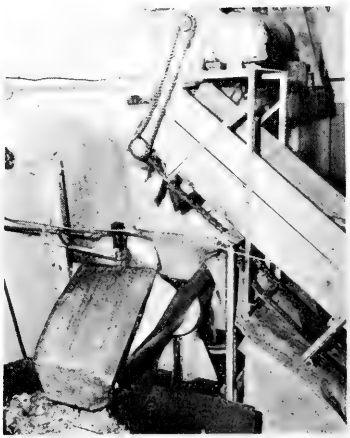


FIG. 11 - GRINDER (REQUIRES 15-HORSEPOWER MOTOR).

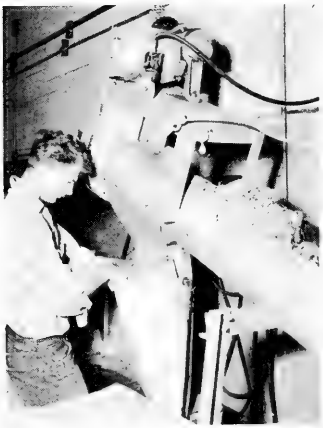


FIG. 12 - FILLING BAG WITH FISH THAT HAS BEEN GROUND UP. THESE ARE THREE-PLY BAGS WITH POLYETHYLENE LINERS. EACH BAG HOLDS 55 POUNDS OF GROUND FISH.

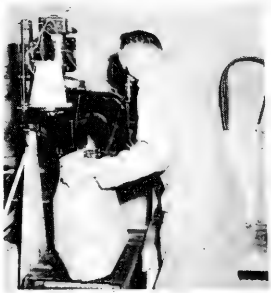


FIG. 13 - BAG-SEWING MACHINE. THIS MACHINE WILL SEW SEVEN BAGS PER MINUTE.

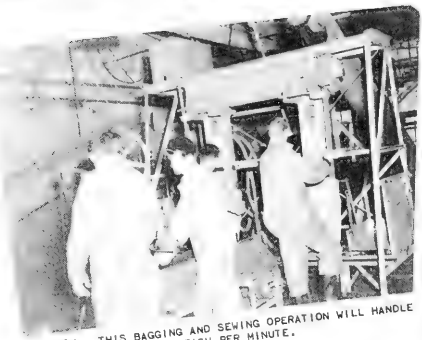


FIG. 14 - THIS BAGGING AND SEWING OPERATION WILL HANDLE 500 POUNDS OF GROUND FISH PER MINUTE.

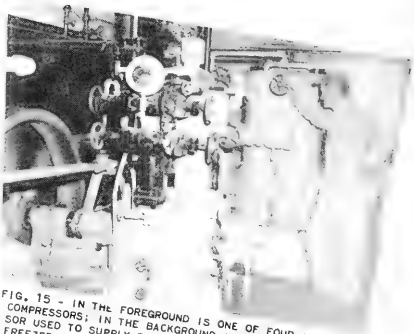


FIG. 15 - IN THE FOREGROUND IS ONE OF FOUR AMMONIA COMPRESSORS; IN THE BACKGROUND IS A BOOSTER COMPRESSOR USED TO SUPPLY THE REFRIGERATION FOR THE SHARP FREEZER.

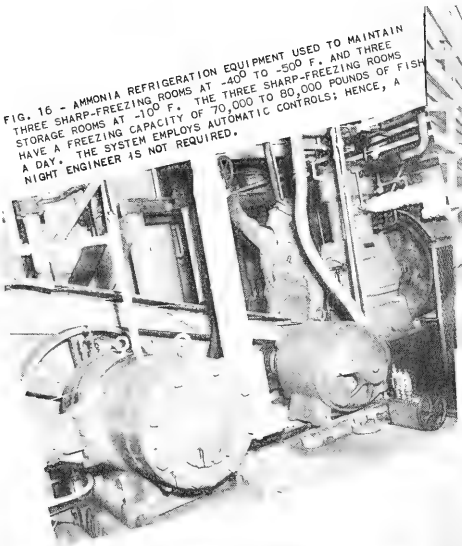


FIG. 16 - AMMONIA REFRIGERATION EQUIPMENT USED TO MAINTAIN THREE SHARP-FREEZING ROOMS AT -40° TO -50° F. AND THREE STORAGE ROOMS AT -10° F. THE THREE SHARP-FREEZING ROOMS HAVE A FREEZING CAPACITY OF 70,000 TO 80,000 POUNDS OF FISH A DAY. THE SYSTEM EMPLOYS AUTOMATIC CONTROLS; HENCE, A NIGHT ENGINEER IS NOT REQUIRED.

FIG. 17 - TRUCKING BAGS INTO SHARP FREEZER.

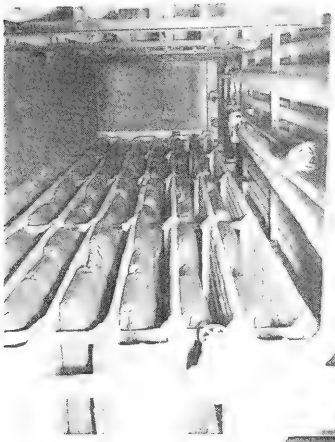


FIG. 18 - SHARP FREEZER WITH A CAPACITY OF 15 TONS. THE BAGS OF GROUND FISH ARE COMPLETELY FROZEN IN 20 HOURS.

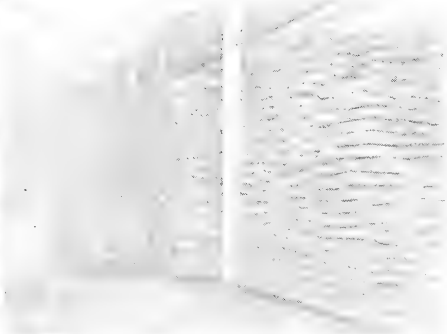


FIG. 19 - BAGS OF GROUND FISH IN FROZEN STORAGE. THIS ROOM WILL HOLD 450 TONS OF BAGGED FISH.

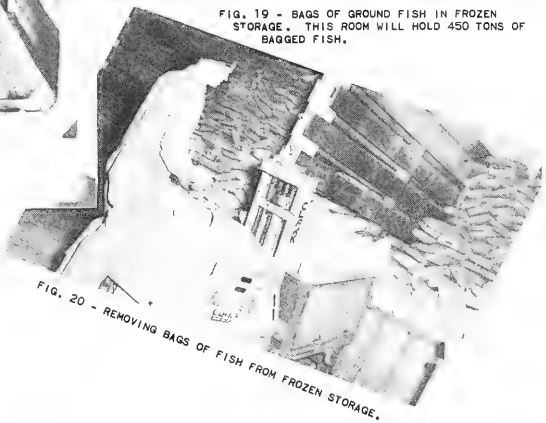


FIG. 20 - REMOVING BAGS OF FISH FROM FROZEN STORAGE.

FIG. 21 - COMING OUT OF VESTIBULE OF FROZEN-STORAGE ROOM WITH BAGS OF GROUND FISH THAT HAVE BEEN IN FROZEN STORAGE.

FIG. 22 - LOADING BAGS ONTO CONVEYOR. LABOR-SAVING DEVICES ARE EMPLOYED WHEREVER POSSIBLE.

FIG. 23 - LOADING BAGS FROM CONVEYOR INTO TRUCK OF FUR FARMER.

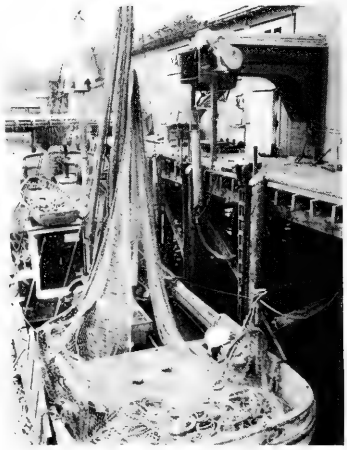


FIG. 25 - FACILITIES FOR LOADING FLAKE ICE INTO FISHING VESSEL. THE ICE IS LOADED BY MEANS OF THE FUNNEL-HOSE DEVICE LYING AGAINST THE SIDE OF THE DOCK.

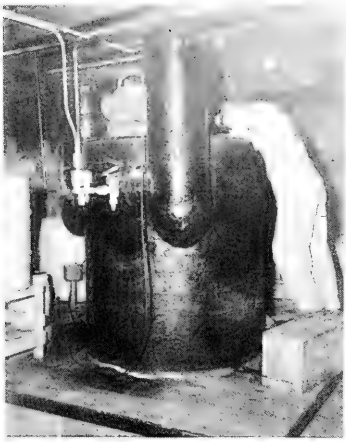


FIG. 24 - FLAKE-ICE MACHINE. ESSENTIALLY, THIS DEVICE IS A LARGE, HOLLOW, VERTICALLY-MOUNTED DRUM MAINTAINED AT A LOW TEMPERATURE BY MEANS OF REFRIGERATION. WATER SPRAYED ONTO THE INNER WALL OF THE DRUM FREEZES IN A THIN LAYER. A ROTATING SCRAPER CRACKS OFF THE ICE, AND THE RESULTING FLAKES OR CHIPS FALL THROUGH THE BOTTOM OF THE DRUM INTO A FROZEN-STORAGE ROOM BELOW. THIS MACHINE WILL PRODUCE $\frac{3}{4}$-TON OF FLAKE ICE AN HOUR. THE FLAKES ARE AT A TEMPERATURE OF 5^{0} F. WHEN THEY COME FROM THE MACHINE AND ARE HELD AT 0^{0} F. UNTIL NEEDED. THE ICE IS USED BY DRAG BOATS AND BY FUR FARMERS WHEN HAULING FRESH FISH.

FIG. 26 - FROZEN STORAGE FACILITIES OF FUR FARMER AT BAY CITY, ORE. FISH PRODUCTS ARE OBTAINED FROM ASTORIA, NEWPORT, AND NEARBY GARIBALDI. THE PRODUCTS, IF NOT BAGGED, ARE FROZEN AND THEN ICE GLAZED TO PREVENT DESICCATION AND OXIDATION.

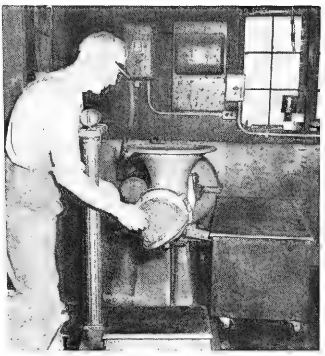


FIG. 27 - PREPARING TO GRIND FISH IN A FUR FARM. PLATES HAVE $\frac{3}{8}$ - OR $\frac{1}{2}$ -INCH HOLES. THE DEVICE IS RUN BY A 25-HORSEPOWER, 3-PHASE MOTOR AND WILL GRIND ABOUT 2.5 TONS OF FISH AN HOUR.

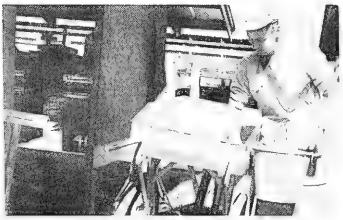


FIG. 29 - TRANSFERRING FISH MIXTURE TO PAIL.

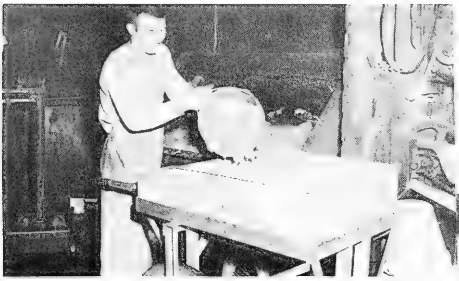


FIG. 28 - LOADING GROUND-UP FISH MIXTURE INTO CART. THE MIXER BEHIND THE WORKMAN IS RUN BY A 5-HORSEPOWER, 3-PHASE MOTOR.

FIG. 30 - FEEDING GROUND FISH MIXTURE TO MINK KITS. THIS FARM AND TWO ASSOCIATED ONES PROVIDE A YEAR-AROUND LIVELIHOOD FOR FOUR MEN AND THEIR FAMILIES. DURING THE PELTING SEASON, TWO ADDITIONAL PERSONS ARE EMPLOYED.

NOTE: ACKNOWLEDGMENT: THE AUTHOR GRATEFULLY ACKNOWLEDGES THE KIND AID OF CHARLES SMITH, PRESIDENT; MARVIN HILLE, MANAGER (ASTORIA); FRANK SCHAUB, FOREMAN; ORVAL HART, CHIEF ENGINEER; AND NORMAN GREEN, MANAGER (NEWPORT) OF THE OREGON FUR PRODUCERS ASSOCIATION; CAPTAIN GORDON WHITE, OF THE DESTINY; ROBERT H. WATT, AND BOB WATT, AND GEORGE IMHOFF, MINK FARMERS AT BAY CITY, ORE.; AND FRED C. CLEAVER AND MARTIN HEERDT OF THE U. S. BUREAU OF COMMERCIAL FISHERIES.

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West Coast Albacore Fishermen Adapt Unique Method for Relaying Information by Ship's Radio

Albacore tuna fishermen on the Pacific Coast during the last several years have adapted a rather unique method for relaying information by radio. At present ship-to-ship radio conversations are conducted on two Federal Communications Commission authorized frequencies, 2638 kilocycles and 2738 kilocycles. Due to the large amount of traffic on the air it is almost impossible for a vessel to transmit any distance unless he has a powerful set. The larger sets are able to drown out the smaller ones, but even the large powerful sets have trouble putting out over 100 miles. Much confusion with interrupted conversations take place so that practically every call takes much longer to complete, and most distant messages are so garbled that they make sense to no one.

Larger sets do not solve the problem because the same confusion will be continued only on a louder and noisier basis. Probably the classic remark that this observer heard on the air relative to this problem was: "Things are really getting out of balance. I have a 60-watt set on a 1,000-foot boat, and this other fellow overriding me has a 1,000-watt set on a 60-foot boat, so I don't know exactly what I am going to have to buy in order to transmit."

As albacore range over a wide area from Guadalupe Island, off Lower California, up the coast of California and Oregon, and off Grays Harbor, Wash., fishermen are constantly seeking information from other areas. Being a rapidly swimming fish, it is not uncommon for albacore to disappear in one area and show up 100 miles away several days later. Fishermen in an area where the fish have disappeared immediately all get on the air trying to find out where the fish have gone. This creates confusion and the fishermen have difficulty in getting proper information for their next move.

Recognizing the problem, a few of the vessel owners got together in an effort to arrive at some solution. It was decided that they would seek the cooperation of all of the other groups using the same frequency; such as, other fishing vessels, yachtsmen, sports-fishing operators, tugboat men, etc. They felt that if they could have the air to themselves for one hour a day they could get all the information they desired on the air in that time, and if the other operators were willing to voluntarily stay off the air for that period, a great deal of "hash" or confusion would be eliminated. There are approximately 15,000 vessels with transmitters registered on the Pacific Coast, and when one considers that there are over 1,500 albacore vessels on the West Coast, it is easy to understand how eliminating most of their transmissions would help the picture greatly. The other operators agreed to cooperate, and it was decided that each day during the albacore season all vessels would stay off the air between 12 noon and 1 p.m. This was cut down to 12 noon to 12:30 p.m. when it was found that all of the information could be collected or relayed in half an hour. Each day a vessel is appointed by the previous day's chairman to serve as chairman for that day. Promptly at 12 noon all vessels go off the air, and the chair-

man transmits his position, fishing conditions, weather, and any other pertinent data. Step by step he works his way up the coast calling other vessels in each fishing area. Each in turn gives the desired information all the way from Guadalupe Island to Grays Harbor. If transmission happens to be poor on any given day, the messages are relayed by vessels in between.

Surprisingly enough this "Silent Hour" has received practically 100-percent cooperation from all other vessels. The information given has undoubtedly saved lives as a few vessels have gone on the air during the "Silent Hour" and put out distress messages which probably could not have been heard otherwise. It has saved fishermen time and money in prospecting for fish, and has greatly assisted others to get special messages in times of emergency at home.

Most cannery operators listen to the reports along with the fishermen, and are able to keep abreast of what takes place on the fishing grounds daily, thereby, becoming more efficient in their operations.

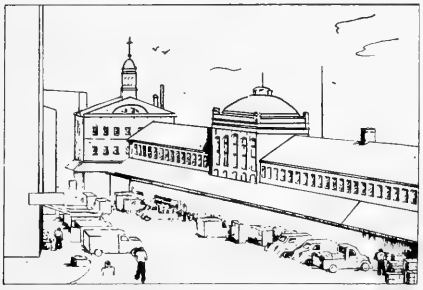
With the large number of vessels of all types coming into the small boat field yearly, the traffic on the air in most regions is getting so heavy that it is practically impossible to get messages through. With someone to take the lead, a program of this type can be worked out and part of the traffic practically eliminated.

--A. D. SOKOLICH, FISHERY MARKET NEWS REPORTER, MARKET NEWS SERVICE, BUREAU OF COMMERCIAL FISHERIES, SAN PEDRO, CALIF.

Wholesale Prices, October 1957

Changes in the over-all edible fish and shellfish (fresh, frozen, and canned) wholesale price index (119.3 of the 1947-49 average) from September to October 1957 were slight. Prices were quite stable on the average, with increases and decreases just about balancing each other out. Compared with the same month a year ago, prices this October rose 6.0 percent.

From September to October this year prices declined (4.4 percent) for all the items in the drawn, dressed, or whole finfish subgroup, except for large haddock prices at Boston which increased about 20.5 percent. Declines in the prices for Pacific Coast halibut (down 19.5 percent) and king salmon (down 3.3 percent) were due to the changeover in October from fresh to frozen prices. Lower prices for the freshwater fish items were normal following the strong September holiday market. The market this October continued to be firm for haddock at Boston due to seasonally-low catches, low inventories, and a good demand. This October's index for this subgroup was 9.6 percent above the same month in 1956 due to higher prices for all items except halibut (down 17.1 percent) and lake trout (down 14.6 percent). The most pronounced increase this October was in the large haddock price which was 75.1 percent higher than in October 1956.



Fresh processed fish and shellfish prices in October this year were up 2.0 percent from September, due primarily to firm fresh shrimp prices following the rather sharp decline that occurred in September. Higher prices this October for small haddock were reflected in an increase of 14.7 percent in fresh haddock fillet prices at Boston as compared with the previous month. As compared with October 1956, the index for the subgroup this October increased 6.7 percent due to higher haddock fillet and shrimp prices. Oyster prices remained unchanged from a month ago and a year ago this October.

Frozen processed fish and shellfish prices increased 2.0 percent from September to October due to the stronger market for frozen shrimp prices (up 5.1 percent) at Chicago. Frozen fillet prices remained firm except that frozen haddock fillet prices at Boston were down about one cent a pound. As compared with October 1956, the subgroup index this October was higher by 12.2 percent, due principally to higher shrimp prices (up 21.2 percent) and frozen haddock fillet prices (up 3.7 percent). This October's flounder fillet prices were slightly lower and ocean perch fillet prices were unchanged from the same month in 1956.

Although the subgroup index for canned fishery products in October this year remained almost at the same level as the previous month, there were some significant price changes among the individual items included in this subgroup. From September to October canned light meat chunk-style tuna prices rose 2.2 percent and were 5.6 percent higher than in the same period in 1956. Offsetting this increase, canned California sardine prices dropped 5.5 percent and Maine sardine prices dropped 2.0 percent from September to October. The drop in California sardine prices reflect the current price for the 1957 pack. But since the pack to the end of October was substantially less than the previous year, fu-

ture prices will depend on the outcome of the fishery during the last two months of the year. Compared with October 1956, canned prices this October for California sardines were up 9.7 percent, but for canned Maine sardines they were down 16.1 percent. There is very little technical reason for any changes in the canned salmon market because light stocks are counterbalanced by some resistance to any further price increases.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, October 1957 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices1/ ($)		Indexes (1947-49=100)			
			Oct. 1957	Sept. 1957	Oct. 1957	Sept. 1957	Aug. 1957	Oct. 1956
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					119.3	120.0	116.0	112.5
Fresh & Frozen Fishery Products:					133.1	134.3	127.0	122.0
Drawn, Dressed, or Whole Finfish:					134.3	140.5	112.9	122.5
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.12	.10	118.0	97.9	80.6	67.4
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.35	.44	109.6	136.1	99.0	133.5
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.73	.75	162.9	168.5	133.7	150.6
Whitefish,L. Superior, drawn, fresh	Chicago	lb.	.64	.73	158.7	179.7	151.2	135.9
Whitefish,L. Erie pound or gill net, rnd., fresh	New York	lb.	.98	.97	197.2	195.1	161.8	161.8
Lake trout, domestic, No. 1, drawn, fresh	Chicago	lb.	.64	.67	131.1	137.3	125.0	153.6
Yellow pike, L. Michigan&Huron, rnd., fresh	New York	lb.	.51	.63	119.6	146.6	152.4	83.3
Processed,Fresh (Fish & Shellfish):					133.8	131.6	134.0	125.4
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.39	.34	132.7	115.7	103.8	91.9
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.78	.77	122.5	120.9	133.5	112.2
Oysters, shucked, standards	Norfolk	gal.	6.00	6.00	148.5	148.5	142.3	148.5
Processed, Frozen (Fish & Shellfish):					119.2	116.9	131.3	106.2
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.39	.39	100.8	100.8	102.1	102.1
Haddock, sml.,skins on, 1-lb. pkg.	Boston	lb.	.29	.30	89.5	92.6	91.0	86.3
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.27	.27	108.8	108.8	108.8	108.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.83	.79	128.1	121.9	148.9	105.7
Canned Fishery Products:					99.7	99.6	100.3	99.0
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	22.65	22.65	120.0	120.0	120.0	120.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.45	11.20	82.6	80.8	80.8	78.2
Sardines, Calif., tom. pack,No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	8.50	9.00	99.2	105.0	105.0	90.4
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs.	New York	cs.	6.46	6.59	68.7	70.1	75.0	81.9

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

Fishery Market News Service Observes Twentieth Birthday

The Fishery Market News Service, which serves as the eyes and ears of the fishing industry by collecting and disseminating commercial fishery information, will celebrate its twentieth anniversary on November 30, the Department of the Interior announced.

The Fishery Market News Service, which was organized in 1937, issues daily market news reports covering all aspects of the fishing industry for the use of the fishermen, buyers, and distributors. Today, it operates in Boston, Chicago, New Orleans, New York, San Pedro, Seattle, and Hampton, Va., as an activity of the U.S. Bureau of Commercial Fisheries.

Since timeliness is important in the market news program, the Bureau of Commercial Fisheries has an average of 40 reporters and agents in principal landing ports and market areas, gathering and transmitting information on landings, receipts, stocks, canned packs, market trends and conditions, prices, and developments in the fishery and allied industries.

The seven offices of the Fishery Markets News Service relay pertinent data to each other, and each office in turn releases information to interested persons in its area. In this way, a fisherman landing halibut in the Seattle area knows the wholesale price that species is bringing that day in New York and Chicago. In the same way, the distributors in New York and Chicago and elsewhere know how much fish is being landed on the West Coast on that day and the prices paid to the boats.

The shrimp fishermen in the Gulf and South Atlantic ports know the prices of shrimp in New York, Chicago, and Los Angeles, and the Boston fishermen and dealers know the price of frozen fillets in Chicago and New York. With all this complete and current information, business transactions relating to fish or fishery products can be conducted with each interested party having all the authentic data necessary for intelligent bargaining and making sound business decisions.

The market information is made available to the public through daily mimeographed releases called Fishery Products Reports, by telephone, personal contact, collect telegrams, and in some instances through radio and newspapers. Each office issues its own daily report, which is designed to meet the needs of the fishery industries in its area.

There are about 9,000 subscribers to the daily mimeographed reports. Most of these are persons interested in the daily market transactions. The reports are sometimes used as the basis for "open-end" contracts in which the seller and buyer

agree that the price of a shipment will be the highest paid for that product at a designated market on the day of delivery as reported in the daily report issued by a specific office.

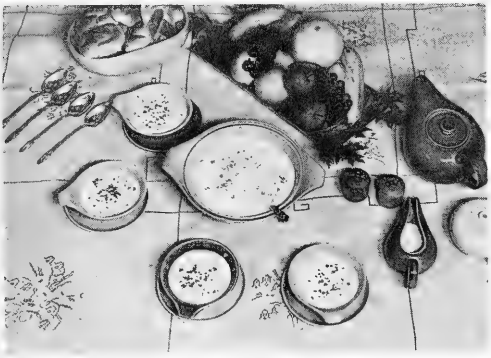
The mailing lists include not only fisheries people but lawyers, research analysts, investment analysts, marine accountants, transportation companies, chemical companies, gear manufacturers, banks, and many others.

CORRECTION

Article "New Fishery For Small Shrimp" on p. 42 of the November 1957 issue of Commercial Fisheries Review, first sentence should read: "The catch of small pink shrimp landed at Westport, Wash., exceeded one million pounds for the year ending June 30, 1957."

HOT TUNA CHOWDER

Wintry breezes mean good appetites. One of the most satisfying meals, which can be quickly prepared, is composed of a steaming bowl of tuna chowder, accompanied by crisp crackers, a tossed salad, and apple pie.



Canned tuna is a "natural" as the basic ingredient for a steaming chowder since it is a familiar item in almost every American home. It is also economical, excellent nutritionally, easy-to-prepare, and tasty.

The home economists of the U. S. Bureau of Commercial Fisheries suggest that you take advantage of the abundance of tuna on the market and serve a "Tuna Chowder" after the game.

TUNA CHOWDER

- 1 CAN ($6\frac{1}{2}$ OR 7 OUNCES) TUNA
- 1 CUP DICED POTATOES
- 1 CUP TOMATO JUICE
- 1 MEDIUM ONION, SLICED
- $\frac{1}{2}$ TEASPOON CELERY SEED
- 1 CUP BOILING WATER
- 3 TABLESPOONS BUTTER OR OTHER FAT
- 3 TABLESPOONS FLOUR
- 1 TEASPOON SALT
- $\frac{1}{4}$ TEASPOON PEPPER
- 3 CUPS MILK
- CHOPPED PARSLEY

Drain tuna. Break into large pieces. Combine potatoes, tomato juice, onion, celery seed, and boiling water. Cook for 15 to 20 minutes or until potatoes are tender. Add tuna. Melt butter; blend in flour and seasonings. Add milk gradually and cook until thick and smooth, stirring constantly. Add to tuna mixture; heat. Garnish with parsley sprinkled over the top. Serves 6.

FOREIGN

International

FOOD AND AGRICULTURE ORGANIZATION

MEETING PLANNED ON FISHING COSTS AND EARNINGS: An International meeting on costs and earnings in fishing is being planned by the Food and Agriculture Organization for the autumn of 1958. It is expected that the meeting will last one week and will probably be held in London.

The meeting will be of direct interest to fishermen, fishing boat owners, processors, and others in the world's fishing industries, as well as to governments and organizations concerned with fisheries. "The meeting will be attended by men with direct experience of keeping track of costs and earnings. We hope that 20 or 30 qualified participants will come from important fishing countries belonging to FAO," states the Chief of the Economic and Statistics Branch, Fisheries Division, FAO.

The great part played today by governments in the maintenance and development of fishing industries, such as through subsidies, credit schemes, tax and duty remissions, price support and marketing schemes, and many others, has made studies of costs and earnings of paramount importance to them.

"The industry is also particularly interested in such studies as a basis for negotiation of contract prices, share agreements, minimum and maximum prices, and other business," the FAO official added.

Governments, agencies, and those sections of the fishing industry sending participants will pay the cost of attendance. FAO will provide the secretariat and consultants and run the meeting. The host government will provide the meeting rooms and facilities.

Interested persons who wish to contribute papers to the meeting should write to the Chief, Economics and Statistics Division, Food and Agricultural Organization, Rome, Italy.

GENERAL AGREEMENT ON TARIFFS AND TRADE

JAPAN SIGNS PROTOCOL: The protocol amending the preamble and parts II and III of the General Agreement on Tariffs and Trade, the protocol amending part I and articles XXIX and XXX, and the protocol of organizational amendments, all three done at Geneva March 10, 1955, were signed by Japan on June 17, 1957. Three similar protocols done at Geneva on December 2, 1955, were also signed by Japan on June 1957.

INTERNATIONAL NORTH PACIFIC FISHERIES COMMISSION

UNITED STATES SECTION MEETS IN SEATTLE: The acute situation in the salmon fisheries of the North Pacific during the 1957 season (when the Japanese took a postwar record catch of red salmon on the high seas while the United States salmon run was extremely disappointing) provided a serious background for examination of preliminary reports on salmon research by the United States Section of the International North Pacific Fisheries Commission at a meeting in Seattle, Wash., September 12-13, 1957.

Scientific data collected during the year was to be pooled with that gathered by Canada and Japan at the annual meeting of the entire Commission in Vancouver, B. C., early in November 1957 for study and action by the international group.

Some of the significant points indicated by preliminary research reports were:

1. Tagging carried out by three vessels along the entire Aleutian Chain is still under way, but about 15,000 tags have been affixed this year. Recoveries cannot be considered complete for at least two years. All returns to date from the 1956 and 1957 red salmon tagging were recovered in North American streams or in the area of the Japanese high-seas fishery.

The few pink salmon tags returned to date were all recovered west of the area of tagging, and none from American streams. Tagged chums were recovered both in Asian and American streams.

2. Studies of the 1957 distribution of salmon in the sea showed a heavy concentration north of the Aleutians and slightly west of the provisional abstention line. It was in this area, not heavily fished in previous seasons, that the Japanese made very large catches in a short period in June.

3. Racial studies based on body measurements, blood types, associated organisms, and scale structure are successfully distinguishing between salmon of Asian and American origin. These studies are based on many thousands of samples collected from known locations on the high seas and on both sides of the Pacific Basin and involve great numbers of precise scientific tests and examinations.

4. Unusual net marks on red salmon entering the Bristol Bay fishery in 1957 were studied by the research staff. Although the evidence was not conclusive, there are indications that these marks were made by gill nets of a smaller mesh size than those used by American fishermen.

The United States Commissioners requested their research staff to complete their analysis of the data for the international meeting, and particularly to examine the degree to which it may show the westerly distribution of stocks of salmon of North American origin in the high seas.

All four United States commissioners attended the section meeting: Milton E. Brooding, San Francisco, chairman; Ross L. Leffler, Assistant Secretary of the Interior, Washington, D. C.; Edward W. Allen, Seattle; and John H. Clawson, Anchorage, Alaska.

Advisory committee members attending included: Lowell Wakefield, Seattle, chairman; Robert Kallenberg, Dillingham, Alaska; George Johansen, W. C. Arnold, DeWitt Gilbert, Harold E. Lokken, Seattle; Clarence L. Anderson, Juneau; Milton C. James and John Hodges, Portland; James Waugh and Donald P. Loker, Terminal Island, Calif.

Officials attending from Washington, D. C., included W. C. Herrington, special assistant for fisheries to the Undersecretary of State, Donald L. McKernan, director, U. S. Bureau of Commercial Fisheries.

Scientific research presentations were directed by Dr. W. F. Thompson, Fisheries Research Institute, University of Washington, and C. E. Atkinson, chief, Pacific Salmon Investigations, Bureau of Commercial Fisheries.

INTERNATIONAL WHALING COMMISSION

UNITED STATES ADHERES TO CONVENTION: The protocol amending the International Whaling Convention of 1946, done in Washington November 19, 1956, was ratified by the President on August 30. The ratification was deposited by the United States on the same date, the U. S. Department of State announced in September 1957. This amendment is not in force as yet.

NORTH PACIFIC FUR SEAL CONVENTION

CANADA AND UNITED STATES DEPOSIT RATIFICATIONS: Both the United States and Canada on September 16, 1957, deposited ratifications to the Interim Convention on Conservation of North Pacific Fur Seals, signed at Washington February 9, 1957. This Convention is not in force yet. (U. S. Department of State Bulletin, October 7, 1957.)

INTERNATIONAL PACIFIC HALIBUT COMMISSION

NORTH PACIFIC HALIBUT AREA 3A CLOSED SEPTEMBER 22: The closure of fishing in Pacific halibut Area 3A took place on September 22 (6 a.m. P.S.T.). The International Pacific Halibut Commission made the announcement on September 4 since it estimated that by September 22 the catch limit of 30 million pounds for Area 3A would have been reached. While last year there was a second fishing season of 9 days in Area 3A, this season the regulations call for only one season since the Commission felt that with the 30-million-pound quota the stocks in that area would be fully utilized in the single season.

The Commission at the same time announced that halibut fishing in Areas 3B and 1A were to continue until 6:00 a.m. (P.S.T.) October 16, 1957. Last year Area 3B closed on the same date as Area 3A and was reopened for 9 days the same as Area

3A. In 1956 the first fishing season in Area 3A and 3B closed on August 24 when the catch limit of 28 million pounds for Area 3A was attained.

The official opening date for all halibut fishing in the Pacific regulatory area this year was May 1 at 6:00 a. m.(P.S.T.). The United States fleet sailed in time to commence fishing on the opening day, but the Canadian fleet did not sale until May 3 and started fishing about 5 days after the United States fleet because of a labor-management dispute over certain fringe benefits and "lay" apportionments. In 1956 the opening date was May 12, but both United States and Canadian fishermen voluntarily agreed not to start fishing until May 20. In 1955 the official opening date was also May 12 and actual fishing started on that date.

This year Area 3A was open to fishing for 144 days--the longest season for this area since 1945 when the area was open to fishing for 147 days. Prior to 1955 the trend had been towards a shorter season, but since that year fishing has been spread over a greater number of days due to a combination of several factors: (1) a decline in the number of vessels fishing for halibut; (2) labor-management disputes; (3) voluntary tie-ups by fishermen; and (4) weather conditions. Prior to this year Areas 3A and 3B opened and closed at the same time. As compared to 144 days for Area 3A this year, Areas 3A and 3B were open for halibut fishing for 104 days in 1956, 81 days in 1955, 58 days in 1954, 52 days (shortest on record) in 1953, 60 days in 1952, 56 days in 1951, 66 days in 1950, 73 days in 1949, and 72 days in 1948.

Areas 2 and 1B were closed to fishing on June 17 when the quota of 26.5 million pounds for Area 2 was attained. A second fishing season in Areas 2 and 1B took place from July 29-August 5.

Under authority of the Convention between Canada and the United States of America for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea, this year's regulations became effective April 10, 1957.

ORGANIZATION FOR TRADE COOPERATION

JAPAN ADHERES TO AGREEMENT: The agreement on the Organization for Trade Cooperation, with annex, done in Geneva March 10, 1955, was signed by Japan on June 17, 1957. This agreement is not in force as yet.

TRADE AGREEMENTS

AUSTRALIA AND JAPAN SIGN NEW TRADE AGREEMENT: A new trade agreement between Australia and Japan, providing for reciprocal most-favored-nation treatment in all matters of trade between the two countries, was signed in Tokyo July 6, 1957, and was made provisionally effective from that date pending the exchange of ratifications.

Imports into Australia from Japan are now admitted at the most-favored-nation rates of duty applying to non-British countries.

Australia

MODERN TRAWLER TO INVESTIGATE FISHERY POTENTIAL OF GREAT AUSTRALIAN BIGHT: In order to investigate the possibility of establishing a commercial fishery in the Great Australian Bight, a modern Diesel trawler of 160 feet or more will be purchased by the Australian Government.

The project will be financed from the Fisheries Development Trust Fund. It was recommended to the Minister for Primary Industry by the Interdepartmental Committee which considers developmental proposals to be financed by the Fund, and was supported by the Western Australian, South Australian, and Victorian representatives at the conference of Commonwealth and State Fisheries officers in Canberra at the end of May 1957. The Victorian delegate emphasized that his State, as a major importer of fish, would welcome increased supplies of fresh fish.

An increase in Australian production of fresh fish has become an urgent need.

In two years (1953/54 to 1955/56) fish landings (excluding crustaceans and molluscs) fell by 18.1 percent. The catch taken by the steam trawlers based at Sydney has fallen in seven years from about 10 million pounds to 3.6 million pounds. Only four trawlers are operating now instead of 12 as formerly.

In 1955/56, Australian landings of fish, crustaceans, and molluscs at 43.8 million pounds (edible weight) was sufficient to provide only the extremely low per capita consumption of 4.7 pounds. A total of 52.5 million pounds of imports, less about 5.5 million pounds of exports, raised this figure to 9.7 pounds. If Australia's population continues to grow at the rate of about 250,000 a year, fish imports will continue to rise unless domestic production is increased.

After careful consideration of the conditions under which any vessel in the Bight must operate, it was recommended that a Diesel trawler of about 160 feet would enable the Bight grounds to be efficiently worked.

One important advantage of a vessel of this size for fishing in the Bight is that it will be able to fish in all but the worst weather, and thus maintain a flow of fish to the markets. This in turn should help to stabilize prices and encourage distributors to expand their handling of the catch on a permanent basis.

The trawling grounds in the Great Australian Bight were discovered in 1912-13 by the Commonwealth investigation ship Endeavour, which was lost with all hands in a storm in December 1941.

In 1949-52 a London-originated commercial venture fished the grounds with two obsolete steam trawlers, using English wartime utility nets that were too small and heavy in construction for Australian fishing conditions. Even under these handicaps, one of the ships averaged 3,222 pounds of fish per day's absence from port and the other 2,594 pounds, compared with 3,000 pounds for Sydney-based trawlers. It may be expected that a modern Diesel trawler will do considerably better.

The catches taken by the two trawlers included three fishes that form the bulk of the southeastern trawl fishery catch--flathead, morwong and nannygai--also red snapper, queen snapper, silver flounder and three types of boarfish. (August 1957 Fisheries Newsletter of the Australian Commonwealth Director of Fisheries.)

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, SEPTEMBER 1957, P. 51.

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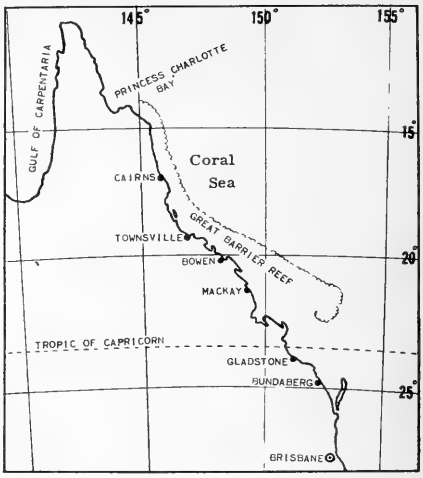
NEW SHRIMP RESOURCE DISCOVERED ON FIRST STAGE OF YEAR'S SURVEY: On the first stage of a survey of shrimp resources in Queensland and northern New South Wales, the Australian Government chartered vessel Challenge located an extensive new ground near Fraser or Great Sandy Island (southern Queensland) between Double Island Point Light and Indian Head. The ground extends from 6 to 20 miles offshore in water up to 35 fathoms and covers an area of about 750 square miles. Large king shrimp (Penaeus plebejus) were predominate, and some tiger shrimp (P. esculentus) were taken, but no banana shrimp (P. merguiensis).

Some fishermen have started to fish the new area.



The survey, which is scheduled for 12 months, is being financed from the Fisheries Development Trust Fund and carried out by the Commonwealth Fisheries Office.

Employed in the survey is Australia's newest and most up-to-date shrimp vessel Challenge, which has been chartered for the full 12 months.

In a press statement announcing the survey, the Australian Minister for Primary Industry said:

"Prawn fishing promises to become the basis for a valuable export trade, mainly with the United States where shrimp are a favorite sea food. In 1955/56 Australia exported about 100,000 pounds of shrimp. By mid-January 1956/57, exports had already reached 206,000 pounds, worth about £70,000 (US$156,000).

"While the United States is by far the biggest market for Australian shrimp, we are also selling small quantities to the United Kingdom, South Africa, and Fiji and other Pacific Islands.

"The known grounds in northern New South Wales and southern Queensland are already being heavily fished and it is most desirable to ascertain the real extent of our shrimp resources.

"The Australian species which brings the highest price in the United States is the banana shrimp, which is fished in waters near Bundaberg. It is considered that the ocean waters within the tropics and near the large Queensland coastal rivers are areas which are most likely to carry shrimp stocks."

The Challenge has been converted into the most modern shrimp vessel in Australia and uses a coil brine tank for immersion freezing. This method appears to produce a better product than conventional freezing, and the product has a longer storage life. Freezing takes place much faster.

The Challenge is 85 ft. by 20 ft. by 7 ft. The engineroom is aft. The main engine is a Diesel twin unit developing 375 hp. at 2,100 r.p.m. It is cooled by a heat exchanger. Independent clutches enable the ship to be run on one of the twin engines if necessary, and each engine has independent electrical starting from four 6-volt, 15-plate batteries which also supply electricity for some of the ship's lighting.

The auxillary engine is a 3-cylinder Diesel developing 80 hp. at 1,850 r.p.m. It is started by two 6-volt, 25-plate batteries and is cooled by a heat exchanger. This engine drives the ammonia compressor ($6\frac{1}{2}$" x $6\frac{1}{2}$" twin), and the main 15 hp. generator which supplies power for driving the winch, brine-tank agitator, brine-circulating pump, forced-draught condenser fans, battery charger, and bilge pump.

A second $6\frac{1}{2}$-hp. generator is driven by the main engine. This generator supplies enough power to drive several but not all of the equipment items mentioned above at the same time.

The winch and gallows are aft of the deckhouse. The winch is electrically driven through a double worm drive gear box, giving independently operated drums.

The freezing and packing chamber is 20 ft. by 10 ft. by 6 ft. The ammonia-coil-brine-immersion tank, which is made of heavy galvanized iron, is 6 ft. 6 in. by 3 ft. 6 in. by 4 ft. 6 in., and the actual immersion area is 4 ft. by 3 ft. by 1 ft.--large enough to hold four 50-pound galvanized wire baskets of whole shrimp. The brine is circulated by an electrically-driven, 3-bladed, 9-inch diameter propeller turning at 720 r.p.m. Temperature can be held at 0° F.

The holding room is 21 ft. by 13 ft. by 8 ft. It is insulated for 0° F. temperature and is cooled by a 3-fan (16-inch diameter) forced-draught condenser. Brine from the freezing tank is circulated through the unit by an electrically-driven 1-inch pump. The holding room is loaded through a port at the after end and an insulated hatch is provided in the deckhead for discharging. All drainage from both the holding and freezing rooms goes into a sump, so none can find its way into the bilge.

The Challenge has bunk accommodation for 5 in the forecastle and 1 in the wheelhouse, and two berths can be fitted if necessary in the wings amidships. There is seating for 8 in the messroom.

The fresh-water tank holds 250 gallons and the fuel tank 867 gallons. Cruising consumption of 10 gallons per hour gives the vessel a range of about 700 miles.

Equipment includes a transreceiver and an echosounder.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, OCTOBER 1957, P. 24, AND SEPTEMBER 1957, P. 60.

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PEARL-SHELL OPERATIONS OFF AUSTRALIAN COAST BY JAPANESE IN 1957: Japanese pearl-shell fishermen operated off the northern coast of Australia during the 1957 season under an arrangement made by the Australian Commonwealth Government--but in order to conserve pearl-shell resources limits were placed this year on their activities in certain areas.

The Japanese operated again this year under the Provisional Regime set up by the Governments of Australia and Japan. This is a temporary arrangement concluded in 1954 pending a decision by the International Court of Justice on Japan's challenge to the validity in International Law of the Australian Pearl Fisheries Act 1952/53.

Arrangements for the 1957 season were substantially the same as those in force in 1956. The number of pearling vessels approved was the same and the greater part of the Japanese operations took place off the Northern Territory.

"In the interests of conserving pearl-shell resources two areas were closed to all pearling and an upper limit was placed on the quantities of shell permitted to be taken by the Japanese in two other areas north of Arnhem Land.

Permission was again given to the Japanese to operate in two areas off the northwest coast of Western Australia, and also to take a limited quantity of shell from an area southwest of Broome. The areas to the west of Torres Strait, made available in 1956, were slightly enlarged this year.

The prohibition against the Japanese operating within 10 miles of the Australian mainland or of an inhabited island was continued. The Japanese were required to comply with all requirements of Australian legislation, including the taking out of licenses, furnishing of production data, and close supervision.

The Commonwealth Government's survey of Australian pearl-shell resources, started in 1956 and suspended during the summer months, was to be resumed as soon as the weather permitted the survey vessel to operate. The survey is expected to provide the information on which effective conservation measures (in the long-term interests of the pearling industry) would be based, states an April 10, 1957, dispatch from United States Embassy in Canberra.

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TUNA RESOURCES OFF WESTERN AUSTRALIA: The Australian Minister of Fisheries informed a member of the Legislative Council of the Western Australia Parliament that a survey of the commercial resources in the seas off the Northwest and the Kimberley coast of Australia show that at least two species of tuna occur in great quantities. The survey under way for several years found that northern bluefin tuna (Neothunnus tonggol) and mackerel or little tuna (Euthynnus alletteratus) occur over a considerable area off these coasts. Other species of tuna, namely yellowfin (Neothunnus macropterus), striped tuna (Katsuwonus pelamis), and dogtooth tuna (Gymnosarda nuda) are found in lesser quantities in these waters.

The fishermen in the above areas are interested in exploiting the tuna resources if a market could be found in the United States. If a market could be found, a modern tuna clipper would be purchased with suitable facilities to freeze the catch for export.

Brazil

JAPANESE VESSELS LAND FISH AT SANTOS: After 12 days at sea, three of the Japanese fishing vessels, Tokai Maru 33, Akashi Maru 33, and Akashi Maru 35, arrived back at Santos, Brazil, on September 12 with a total catch of 90 metric tons. The fourth vessel, the Tokai Maru 35, was expected to unload its cargo of 30 metric tons at Rio de Janeiro.

The company organized to handle the boats has requested the municipal authorities for permission to install 10 distribution stands in various sections of the City of Sao Paulo. Since this permission had not yet been granted, only half of the catch was sent to Sao Paulo and the remainder was stored in a refrigerated warehouse at Santos.

Because of the large amount of fish available, it had been expected that the price would drop sharply As this did not occur, the press interviewed the head of the Fish and Game Section of the State Secretariate of Agriculture. He said the explanation was that the fish went through the regular wholesale trade, because the permission to install stands for sales directly to the public had not yet been granted by the municipal authorities. (United States consular dispatch from Sao Paulo dated September 18, 1957.)

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JOINT FISHING VENTURE WITH JAPANESE OPPOSED BY FISHING VESSEL OWNERS: The arrival of the first four of six Japanese fishing vessels at the port of Santos on August 16, 1957, resulted in a protest by the Association of Fishing Vessel Owners of the Brazilian State of Sao Paulo. The arrival of the Japanese vessels marked the initiation of the agreement between the Brazilian Government and a large Japanese fishing company for permission to fish in the territorial waters of Brazil. The Association's protest to Brazil's President and the Ministry of Agriculture claimed that the Japanese firm had received "special privileges." The

Government in answer to this protest on the part of the vessel owners stated that not only were no special privileges involved, but that the arrival of the Japanese vessels augured well for the more efficient use of one of Brazil's important natural resources.

The agreement reached on July 24, 1957, between the Brazilian Government and the Japanese firm included a plan to put a fleet of small trawlers into operation immediately with the possibility of later building fish-processing plants and a shipyard in Santos for the overhauling, repair, and possible construction of fishing craft. The signing of the agreement resulted in the formation of a subsidiary in Brazil. Two additional Japanese trawlers are due to arrive to implement the first phase of the joint venture.

At the present time the Japanese subsidiary firm "Pescados Oceania do Brasil," is a small distributing organization with over 50 percent of the capital stock owned by the Japanese firm and with the minority stock Brazilian, but largely subscribed to by members of Brazil's substantial Japanese colony. This distributing organization plans to enter into retail sales by opening their own retail outlets, first in Sao Paulo and then in other important cities of the area. It is probable that the fishing vessels will remain Japanese flag boats for the duration of the contract period. In the meantime, steps are being taken to establish a processing company to freeze fish, and process fish into meal and oil. It is reported that the capital structure of the company will be similar to that of the distributing company and that perhaps the same stockholders will participate. Upon completion of the 2- to 3-year agreement, the Japanese flag vessels will become Brazilian flag vessels and will, it is understood, become a part of the Japanese capital investment in the newly-formed processing company. The agreement also specifies that the Japanese will leave Brazilian waters if at the end of the contract period they have not made an arrangement to have the fishing boats become Brazilian flag vessels. It was also reported that while the Japanese company has provided in the contract that a small percentage of profits and/or capital may be repatriated to Japan, the early operations are not expected to produce any profits; and it is the intention of the parent company not to withdraw capital at first, but to re-invest any profits and if necessary provide additional capital during the formative years of the company's existence.

The new fishing company has opened offices in Santos and is planning to open a preliminary sales office in Sao Paulo very shortly, starting with a capitalization of Cr$10,000,000 (about US$132,000), largely in the form of the fishing boats supplied by the Japanese company. The initial fleet of six deep-sea trawlers are expected to be fully equipped to undertake a wide variety of deep-sea fishing. Two of the vessels which have arrived have a 200-ton hold capacity, while the other two are considerably smaller with a hold capacity of only 50 tons. In addition, steps are actually being undertaken to construct the first refrigerated warehouse at Santos, and it is planned to order from Japan in the near future the necessary processing equipment. With the first small fleet, the officers of the Japanese subsidiary company estimate an annual catch of about 20,000 long tons. Officials estimate the total consumption of fish in Brazil at over 1,000,000 tons, and that present operations of the Japanese fleet will not seriously affect Brazil's consumption of fish, the size of the over-all fish harvest, or its distribution. However, it was revealed that the company intends to sharply undersell current wholesale prices of fresh fish, perhaps reducing the price to as much as one-third of the present landed price in either Santos or Sao Paulo. A figure of an estimated landed price of Cr$10 a kilogram (about 6 U. S. cents a pound) was mentioned. This is in comparison to a current price of Cr$35 a kilogram average (about 21 U. S. cents a pound).

At the present time there are no indications that the Japanese company plans to export any of its processed products in the near future. It was, however, reported that the processing company, which is to be formed in the near future, may build a canning factory and thus prepare for possible future export (U. S. Consulate in Sao Paulo dispatch dated August 23, 1957).

NOTE: 1. ALSO SEE COMMERCIAL FISHERIES REVIEW, NOVEMBER 1957 P. 49, OCTOBER 1957 P. 24.
2. VALUES CONVERTED AT THE RATE OF ONE CRUZEIRO EQUALS US$0.0132.

Canada

EXTENT OF NEW SCALLOP GROUNDS ON ST. PIERRE BANK LARGER THAN REPORTED: The extent of the larger scallop beds on St. Pierre Bank, discovered in July by scientists of the Fisheries Research Board of Canada, are larger than an earlier report indicated. The larger of the two beds is roughly rectangular and covers about 70 square miles (previously reported as 12 square miles). Its center is at 45°34' N. latitude, 56°02' W. longitude and runs about NNW. and SSE. magnetic for 14 miles and is about five miles wide in 24-26 fathoms. Several catches were made in this area of 15-25 bushels of whole scallops per 30-minute tow. The shells averaged almost 5 inches in diameter and the scallop meats were large and firm.

Sea Scallop
(PECTEN MAGELLANICUS)

The smaller of the two beds lies about 15 miles north magnetic from the larger bed. It is about 4 square miles in area and has its center at 45°44' N. latitude, 56°09' W. longitude in 25-26 fathoms. Yields from this bed were from 11-15 bushels of whole scallops per 30-minute tow. The scallops were slightly larger than those from the larger bed and had high-quality scallop meats.

Large numbers of small scallops were found both on the newly-discovered beds and in the area west of the old bed (discovered in 1954) on the northern part of St. Pierre Bank. The presence of the small scallops indicate good fishing in all three areas for 1959 and 1960. (Trade News, August 1957, Canadian Department of Fisheries.)

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, NOVEMBER 1957, P. 50.

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INSULATION FROM EEL GRASS: In Shelburne County on the south shore of Nova Scotia, Canada, there is a plant which manufactures insulation from eel grass. This grass, a form of seaweed, is common along the coast of North America and very plentiful in southwest Nova Scotia. Eel grass has a number of natural qualities that make it suitable for insulation: (1) it will not burn or rot; chemically it contains silica, salt, and iodine; (2) each blade of the grayish black material holds millions of minute air cells; this also makes it valuable as a sound deadener.

Eel grass grows from 6 to 10 feet underwater offshore. It breaks off and floats shoreward. During the summer months men gather it up in dories in shallow water, bring it ashore, and dry it in the open fields. The price paid varies from $21 to $30 a ton, depending on the distance the grass must be hauled to the plant at Sable River. (Maine Coast Fisherman, December 1956).

Chile

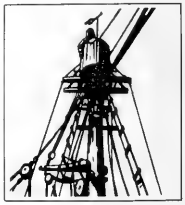
JAPANESE APPLICATION FOR INVESTMENT IN WHALING INDUSTRY: The application of a large Japanese fishing company for authorization to import into Chile a million dollars worth of equipment and capital for investment in Pesquera del Sur was approved by the Chilean Foreign Investments Committee on June 5, 1957. To finalize this action the Minister of Finance and the President must each sign this approved application, indicating their separate approval and application must then be submitted to the Comptroller General for his approval. Once these three concurrences have been obtained, the foreign investor may proceed with the importation under the specific conditions laid down by the Foreign Investments Committee when it issued its statement of approval. If one of the three approvals just listed is withheld, the application must be returned to the Committee for further consideration, an August 6, 1957 dispatch from the United States Embassy in Santiago reports.

In the case of the Japanese application, once the Committee has issued its approval on June 5, no further official action was taken until approximately the middle of July. During this interim period, both the opponents and proponents of this investment continued to give voice to their respective arguments for and against the investment which had all been advanced during the period when the application was being considered by the Foreign Investments Committee.

In general, the arguments against the authorization of this proposed investment were advanced by (1) Chilean private fishing interests and (2) the majority of other business interests in Chile. Their arguments followed these lines: (1) the whaling industry is being adequately exploited now and the introduction of more personnel and equipment would be detrimental; (2) Japanese whaling methods differ considerably from Chilean methods, in that they are crude--they will reduce the available stock in a few years and the industry will gradually disappear; (3) the Japanese plan is, in effect, a cover for the Japanese Immigration Department's plan to send large numbers of Japanese, with their families, to settle in Chile; (4) it is inadvisable to permit a foreign firm to install its headquarters just across a rather narrow bay from Chile's most important naval base; (5) the authorization to the Japanese company constitutes a violation of the Chile-Peru-Ecuador Agreement for the protection of the resources of the South Pacific, which forbids the establishment of land-whaling stations within 250 miles of one already established

Advocates of the investment, mainly Chilean Government officials, argue in general as follows: (1) the introduction of new foreign capital into Chile is a worthwhile goal in itself; (2) the Chilean whaling industry would benefit by foreign competition; the field has not been adequately explored because a few individuals have been able to dominate this industry in Chile.

On or about July 15, 1957, both the Minister of Defense and the President signed the decree authorizing this importation of capital, and the decree was forwarded to the Comptroller General for the final act which would constitute acceptance or rejection of the proposal. To date no statement has been issued by the Comptroller General. The matter has been discussed by industry, by the Ministry of Agriculture, and on the floor of the Chamber of Deputies. In the Chamber a strong case was made against this investment and the recommendation was made that, if necessary, a special Session of Congress be called to review the subject in detail.



Colombia

NEW REGULATIONS RELATING TO THE FISHING INDUSTRY: On September 1, 1957, the study of maritime fauna and the regulation and approval of fishing licenses was transferred from the jurisdiction of the Ministry of War to the Ministry of Agriculture. In addition, fishing in Colombian territorial waters will henceforth be permitted only by ships operating under the Colombian flag or by foreign vessels operating under contract with firms domiciled in Colombia.

The resolution was the result of a conference held by fishing industrialists with the Minister of Agriculture on August 27, 1957. The industrialists also asked for the creation of a National Fisheries Office, expansion of credit facilities, and importation and distribution of fishing implements through the "Caja Agraria." Officials of the Ministry of Agriculture state that these requests are currently under study, points out a September 11, 1957, United States Embassy dispatch from Bogota.

Cuba

OFFICIAL STATES VIEWS ON THE "LAW OF THE SEA": The August 22, 1957, issue of the Havana daily newspaper Excelsior published an interview with the Special Adviser to the Cuban Ministry of State on legal matters on the subject of territorial waters, the continental shelf, the high-seas fisheries, and related matters. The Special Adviser is a member of the United Nations International Law Commission and Cuba's representative on the Inter-American Council of Jurists.

In the interview, the Special Adviser reiterated the position which Cuba has been following in the United Nations and the Organization of American States on these matters. He reaffirmed Cuba's adherence to the three-mile limit of territorial waters, basing this stand on the traditional rights of states to engage in fishing on the high seas. With respect to the continental shelf, he pointed out that there was general

agreement on the proposition that the coastal state has "exclusive and sovereign rights . . . over the resources found in the seabed and subsoil of the continental shelf, or insular or other submarine areas adjacent to its territory." He went on to point out, however, that no such unanimity exists with respect to waters over the continental shelf. In response to a query regarding the depletion of certain species of fish, he called attention to the desirability of continuing to meet this problem through cooperation among states interested in the fishery, rather than through unilateral action by the coastal state.

In reply to a question regarding freedom of the seas and nuclear experiments and referring to the possibility that this subject might arise at the forthcoming United Nations Conference on the Law of the Sea in Geneva in 1958, he stated: "Of course in case of a debate on this question it would first have to be determined to what extent this charge (the danger of contamination of the waters by radioactivity) can be scientifically proven, given that among the rights guaranteed all states under the principle of freedom of the sea is that of making scientific experiments on the oceans. The question is also important because the experiments which are currently being conducted can likewise be directed toward making progress in the peaceful uses of atomic energy."

Denmark

FISH CONSUMPTION DECREASING: At a meeting held in Odense, Denmark, on August 19, 1957, by the National Organization of the Danish Fish Retailers, it was stated that the annual consumption of fish per capita in 1956 was only 12 kilograms (about 26.5 pounds) compared to 14 kilograms (about 30.9 pounds) in 1955, a decline in total consumption of 9 million kilograms (19.8 million pounds).

The Danish Minister of Fisheries, who attended the meeting, recommended that a publicity campaign be launched to promote fish consumption. Another fisheries official expressed the opinion that the decrease in consumption of fish was due to the fact that the National Organization of Fishery Propaganda had stopped its publicity campaign. The former Minister of Fisheries was of the same opinion and suggested that a new publicity campaign be started.

Statistics for 1956 indicate an over-all increase in meat consumption in Denmark of 6 percent over the preceding year, states an August 27 dispatch from the United States Embassy in Copenhagen.

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SEAL SKIN AUCTION BRINGS HIGHER PRICES: The entire lot of seal skins brought up for auction in Copenhagen by the Royal Greenland Trade Department was sold at prices averaging approximately 6 percent over those obtained at the 1956 auction.

Included in the September 3, 1957, auction were 24,588 ringed-seal skins and 619 harp-seal skins. Total sales amounted to 1.8 million crowns (US$261,000), slightly more than expected.

Several foreign buyers were present at the auction, although none directly from the United States. American interests, however, were undoubtedly represented by local commission agents. Principal traditional markets for Greenland seal skins are the United Kingdom and West Germany. (United States Embassy, Copenhagen.)

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VIEWS ON FISHERY TRADE AND COMMON MARKET PLANS: At the annual meeting of the Danish Fishery Trade and Deep Sea Fishing Association held on August 28, 1957 its chairman expressed some rather concrete viewpoints with regard to the effect on the Danish fishery situation of participation in one of the proposed common market plans.

He indirectly supported Danish participation in the European Common Market by stating that Danish fish exports to West Germany and Italy would be endangered if Denmark did not join, and by noting that membership would open the promising French market to greatly increased exports and offer the possibility of regaining the Belgian market. He also maintained that the Danish fisheries would not be injured by increased imports, because of Denmark's favorable competitive position.

With regard to the free-trade area, he stated that Danish participation would not erase the presently existing British duty of 10 percent.

He held that the enactment of a Nordic Customs Union would carry with it improved conditions for the Danish fisheries but would be catastrophic for the Danish canned fish industry. (On this point he undoubtedly referred to the expected domination of this market by Norwegian canned fish.)

In closing he joined an increasing number of Danish economic spokesmen by expressing his opinion that the plan for a Nordic Customs Union had lost practically all actuality since the inception of plans for either a European Common Market or free-trade area. (United States Embassy dispatch from Copenhagen, September 6, 1957.)

El Salvador

REVIEW OF THE FISHERIES: El Salvador's fishing industry, despite its important potential, is very poorly developed. Aside from an unknown number of canoe fishermen, there are only four sizable fishing boats in operation, the largest of which is capable of bringing in perhaps a million pounds a year, and there are only two very small ice plants to furnish the ice which is absolutely necessary for handling fish in a warm climate.

There are no statistics to show the quantity of fish landed in El Salvador; none are kept officially covering the four fishing boats, and there is, of course, no way of totaling the catch of numerous canoe fishermen. Perhaps the catch of the four large boats is 2.5 million pounds a year of fish and 250,000 pounds of shrimp. The fish are of several varieties, bearing local names which are not always subject to translation into English, but the best from the point of view of flavor are "boca colorada" and California corvina. Both of these, when obtained fresh and cooked properly, are very tasty.

The value of the catch at the dockside is usually calculated at 30 centavos (14 U.S. cents) a pound for fish and at 1.25 colones (50 U.S. cents) a pound for shrimp.

The catching, distributing and marketing of the fish is done in a primitive manner. The four fishing boats discharge their catch at small piers at La Union in the Gulf of Fonseca. They necessarily carry a certain amount of ice in their holds, but the quantity is generally found by experts to be far too little. At the dock, the fish or shrimp are weighed--often in the sun--and packed in 100-pound boxes with crushed ice (again usually in insufficient quantities). The boxes are then transported to inland cities and delivered to markets and fish stores. A disproportionately large quantity of the fish has spoiled during this procedure, owing entirely to the use of insufficient ice.

The Government's policies and programs have been for the most part directed toward the regulation of the fish industry. There are elaborate requirements for licenses, for fishing enterprises, and even for single embarkations for fishing purposes. These are set forth in the Government's Decree 1961 of October 25, 1955, which consisted of a fisheries law, and Decree No. 77 of September 12, 1956, which contained the regulations implementing the previous decree. Of significance to foreigners is the fact that while the fisheries law (Decree 1961) stated in its Article 17 that foreigners would be allowed to fish, at least for bait (anchoveta), in El Salvadoran waters, provided they had a license, the regulations which the law stated would be forthcoming have yet to be promulgated, and foreign boats now fish at their own risk.

The Government's industrial development corporation (INSAFOP) has made a survey of a potential fishing industry but has yet to find funds to establish one. There is in effect an industrial processing law, which was designed to encourage

investment in new industries, and which would grant incentive tax concessions to such a new industry if it were founded.

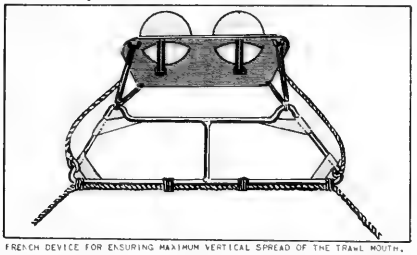
The potentialities of the shrimp fishing industry are good. The shrimp caught in El Salvador is considered to be of good quality, and there is no doubt that it could find a ready market if there were vessels for catching it and facilities for packing it in the proper manner.

France

DEVICE TO KEEP OTTER TRAWL OPEN: How to keep a trawl mouth open vertically without increasing the drag effect has been a problem for a long time. It has been solved, it is claimed, by a Frenchman of St. Malo, who has patented and put on the market a device now on sale in the principal ports of France.

According to latest information heavy sales are being made to French owners, and an English firm has taken up English rights.

Called the "Exocet," it is in effect a framework which carries a rectangular panel at an angle of 30 degrees and which, in turn, has provisions for two or three floats of conventional



FRENCH DEVICE FOR ENSURING MAXIMUM VERTICAL SPREAD OF THE TRAWL MOUTH.

design. This, it is claimed, entirely obviates the objection to the ordinary method of holding the trawl mouth open with floats (whether glass or metal) with which it is found that at about 3 knots the resistance set up against forward movement is greater than their rising force so that the opening is diminished instead of being made larger.

The French technician was faced with the problem of how to produce something sufficiently simple and light, with the least obstacle to easy handling, yet still solid and able to hold its essential position in the water and having the greatest possible lift. He solved these by using an aluminum alloy in the form of a rectangle with rounded corners, reinforced round the edges with flanges, and having provision for floats near the leading edge.

It is fixed directly to the headline at the top of the trawl so that the rectangular part is held at an angle of 30 degrees from the horizontal. It is then found that the rising force increases pro rata to the speed of trawling as the mouth of the trawl is forced open by the force of the water against the inclined plane. Catches are thereby increased as the mouth of the net is enlarged, and a ground can be fished effectively at much higher speed. The risk of tearing the net is also reduced.

The effect of the apparatus, it is claimed by the French interests, is constant under any trawling condition. It has been used by trawlers of all types and proved itself on the grounds. The framework is so designed as to permit the rectangular plate to oscillate freely so that its transverse equilibrium is held. The floats are fixed by special "feet" or cramps which permit easy replacement in case of damage. Their placing is important too, as it insures that the net takes its proper form as soon as it is cast and holds its position should the trawler be stationary or change direction during trawling operations, and prevents any possibility of reversing, alleged to be a major defect in some other devices.

The hydrodynamic form itself is responsible for lowering the resistance to progress. In effect, the pressure on the back of the plate literally forces the mouth of the trawl forward and upwards, forming an arc of which the cod end is the center.

The rising or lifting force is claimed to be greatest at the moment when the trawl is open and is at a maximum in the vertical plane while the opening, fixed as it is right at the center of the trawl mouth, is such as to permit that it is widest where the fish enter. In other words, it has the same effect in a vertical plane as the otter boards have in the horizontal plane.

Three models have been made, differing only in size, the numbers referring to the length in centimeters at the edge. Exocet 80, intended for the largest trawlers with powerful engines; Model 70, for large speedy trawlers fishing for fairly heavy catches and also for the smaller vessels with less powerful motors; Model 60 for the small trawlers or those using small trawls. The latter takes two instead of three floats.

An English visitor to St. Malo saw demonstrations which gave satisfactory results at $3\frac{1}{2}$ knots. British trawlers customarily work at a higher speed, but it is claimed that adaptions permit equally satisfactory results at those speeds (The Fishing News, August 23, 1957.)

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PLASTIC FISH BOX DEVELOPED: A new type of fish box has been developed in France for handling fragile fish, such as sardine. The box is made of polyester, reinforced with fiber-glass. It is 500 mm. (19.6 in.) long, 400 mm. (15.7 in.) wide, and 100 mm. (3.9 in.) or 70 mm. ($2\frac{3}{4}$ in.) deep. It weighs 1 kg. (2.2 pounds) and the sides are perforated with round holes. The box floats on sea water. These boxes can be piled up without crushing the fish, they are very strong, acid- and alkali-resistant, and can be used for brining, washing, and cooking the fish. (La Revue de la Conserve, March 1957.

Iceland

POLISH CREWS FOR FISHING TRAWLERS PROPOSED: Independent Icelandic skippers are eager to employ some Polish crews for their trawlers during the white fish season, the August 16 issue of The Fishing News points out. The Icelandic manpower deficit is put at 3,000 men. The Icelandic trawler owners have made the employment offer official, and it is almost certain to be accepted by Poland.

The rates offered are £120 (US$336) a month for deckhands with experience. Up to 70 percent of the pay would be available for transfer to Poland.

Since Poland is also short of experienced white fish catchers, Icelanders propose to take several dozen graduates of Polish fisheries schools for practical experience on Icelandic trawlers.

According to Polish sources, the visit to Reykjavik of the Polish fisheries training trawler Jan Turleiski has occasioned keen interest in Icelandic trawler circles. She is a steam trawler, and Icelanders are willing to buy one or more for their fishing fleet. Talks now being conducted include employment of Polish crews.

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SUMMER HERRING FISHERY A FAILURE: The summer herring season with purse seines off the north and east coasts of Iceland has failed for the 13th successive year. The 230 vessels taking part provided 653,000 barrels and crans (about 392 pounds) compared with 512,000 last year by 187 vessels.

The season can be called a moderate failure, which means the Icelandic Government will have to distribute large sums to compensate the fishermen.

Although the total catch was higher, much of it was unsuitable for salting, the herring being less fat than usual. Half a million crans went to factories, 140,000 barrels were salted, and 13,000 barrels were frozen.

There is keen disappointment because it was expected that the larger number of vessels of 25 to 150 tons and including five vessels with big purse nets, would enable the fishery to approach its wartime record. Fewer and smaller vessels caught over a million crans in 1944.

Fishermen know the unpredictable behavior of the herring. They point out that since 1944, when the lean seasons began, there has been a succession of good seasons off the west coast of Norway. Markings have shown a close connection and migration habits between Iceland's summer herring and Norway's winter stocks.

The theory has been that if the Norwegians get good winter herring, the next summer season off Iceland will be poor. Last winter, however, the herring season off Norway was poor, but the expectation that as a result the herring would come to the northern coast of Iceland was not fulfilled.

In August the herring went east and the Icelandic vessels pursued them for 150 miles, much farther than usual. Towards the end of August the vessels returned to begin drift-net fishing off the south and west coasts, while some of the bigger vessels of around 100 tons sought more herring between Iceland and the Faroes. (The Fishing News, August 30, 1957.)

Italy

NATIONAL FISHING INSTITUTE OPENED: A National Fishing Institute has been opened in Italy, with the aim of instructing fishermen in the best fishing methods and techniques. The Institute receives a subsidy from the Government, according to the July 1957 World Fishing.

Japan

FISHERY SURVEYS OFF BRAZIL AND DOMINICAN REPUBLIC: The Toko Maru, a fisheries trawler-type patrol ship (1,110 tons gross) belonging to the Japanese Fisheries Agency, returned to Tokyo July 25, 1957, after completing a 9-months' around-the-world voyage in the course of which surveys were made of fishing grounds off Brazil and the Dominican Republic. The scientific party aboard was headed by the Director of the Nankai Regional Fishery Research Laboratory, an outstanding authority on tunas and spearfishes.

Brazilian Surveys: In view of the topography of Brazilian waters, the surveys were carried out in three steps: (1) the southern part of the continental shelf, (2) the tuna long-lining grounds off the eastern part, and (3) the northern part of the continental shelf (vicinity of the mouth of the Amazon River).

(1) Grounds of the Southern Part of the Continental Shelf:

The area of the continental shelf south of 22° S. latitude is about 83,000 square miles. The continental shelf extends to depths of about 150 meters, beyond which the bottom falls off steeply. From the latter part of December to the middle of March, 67 2-hour trawl hauls were made and observations were made on coastal migratory fishes (sardines, mackerel-scad, etc.). During this period, 85 oceanographic stations were occupied.

The results of the trawling survey were: (a) Catches were larger in shallow water and in the south, tended to be smaller in deeper water and toward the north. In waters deeper than 40-50 meters there were rarely indications of potentially-profitable fishing. (b) In general, the fishes which were always most abundant in the catches were small sharks and many species of rays. The market value of these fish is low. (c) The fish of high market value--pescada, corvina, and other sciaenids--were generally abundant in shallow water. (d) The number of different species captured was about 160, fewer than expected. (e) The bottom was good, and of the 67 hauls, only one resulted in a torn net. (f) There was always some wind and sea, but never enough to interfere with fishing.

These results indicate that it would be more profitable to fish this area with small boats rather than with large vessels. However, the survey was made during the middle of the Southern Hemisphere summer, and it may be thought possible that different results would be obtained in winter.

In the survey of coastal migratory fishes, the sonic fish-finder and nightlights were used. There was a high frequency of traces of schools on the fish-finder, particularly in shallow water. The sardine is one of Brazil's most important fishes, but within the scope of this survey no indication of phototaxis was seen; and the fish could not be taken with the nightlight. It was thought that it would be effective to locate the fish by echo-ranging and then use a round-haul net, but this could not be tried because the Toko Maru was not equipped for this type of fishing.

(2) Tuna Long-Lining Grounds off the Eastern Area:

From about 22° S. north to the vicinity of the Amazon's mouth there are coral reefs along the coast, and the prospects for coastal fisheries are slight, so a tuna long-lining survey was made. Long lines were fished 13 times, and during this period 29 oceanographic stations were occupied. The stations were distributed north and south at 50 to 300 miles off the coast. The results were briefly as follows: (a) Catch rates (number of fish caught per 100 hooks fished) ranged from a low of 2.5 to a high of 20, or in terms of weight of a day's catch, from 700 pounds to an estimated maximum of 5,500 pounds. (b) A fishing ground boundary was found at about 4° S., where there was also a sharp change in oceanographic structure. North of the boundary yellowfin were the most abundant tuna in the catch, while south of it albacore were the main species. Quite a few bluefin tuna turned up in the vicinity of the boundary. (c) The northern limit of the northern yellowfin grounds was not made clear by the present survey. Albacore fishing appeared to fall off to the southward, but fair catches were still being maintained at 22° S. (d) Few sharks were caught, and shark damage to the catch was less than in the Indian or Pacific oceans. (e) There were steady force 3 winds, mainly from the northeast, which were not thought to be such as to hamper the operations of a regular long-liner.

In general the area can probably be said to be a superior tuna long-line fishing ground. Since the grounds are close to the coast, it is thought that it would be both possible and profitable to fish them with small vessels.

The scale of long-line fishing on this survey was held down to about one-eighth that of a commercial boat, but it is estimated that the catch per day for a regular long-liner would be 3-5 tons on the albacore grounds, or 10-15 tons on the yellowfin grounds.

It is difficult to form any definitive ideas of the structure of the South Atlantic tuna grounds as a whole, because of inadequate data, but (1) the different current systems form different habitats, and have different characteristics as fishing grounds, and (2) within a given current system the geographical differences in the character of the fishing grounds appear gradually, except where affected by the topography, and sharp changes, like those between current systems, do not appear. If this theory is admitted, the areas of each of the major currents, such as the South Equatorial and the Equatorial Countercurrent, each have their own different characters as fishing grounds, and they will preserve such characteristics as are referred to in (b) and (c) above as we follow them offshore to the eastward, with only gradual changes in fishing ground characteristics within the current systems.

In terms of distance to the fishing grounds, it will be most advantageous to base in such port cities of the northeast as Salvador, Recife, and Fortaleza, whereas southern cities like Rio and Santos are better from the point of view of markets and bait supply.

(3) Fishing Grounds of the Northern Continental Shelf (Around the Mouth of the Amazon):

In this region the continental shelf extends to depths of around 100 meters, with an area of around 73,000 square miles. The bottom is generally covered with coral and rock reefs and is rough, with the echo sounder showing saw-toothed traces, the "teeth" being mostly 2-3 meters high. This condition is especially marked south of the river mouth, being somewhat ameliorated north of the river, where there are accumulations of mud. Around the river mouth, silt makes the ground unfit for trawling. Near the Guiana border there are some rather extensive areas suitable for trawling. During the the period of the survey there were constant northeast winds of around force 3, and the current ran strongly northwest.

Hauls were made at first at the planned station positions, but so many nets were torn that it was judged difficult to complete a comprehensive survey in this way, and it was decided

to use echo-sounding and oceanographic observations to find places to fish. By this system 13 1-hour hauls were made, with trouble developing on only 6 of them. At the same time, 63 oceanographic stations were occupied

Because of the topography, this area offers little possibility of large-scale trawling by big ships. The fish taken were not such as to attract attention, and it appeared that the strong currents would in many cases interfere with operations. It appears to offer some possibilities as a shrimp ground, but because of the type of bottom, it is thought that operations by small vessels would be more advantageous than the use of large ships. However, without a great deal of experience on the grounds, operation would probably be difficult.

Dominican Republic Surveys: Survey work in waters of the Dominican Republic comprised 1 trawl haul (net torn), 5 hauls with a shrimp net, and 6 long-line sets, with 23 oceanographic stations occupied during the period. Because of the topography, there was thought to be little to be hoped for from the coastal fisheries, and results of the survey confirmed this belief. The area is thought to be fairly promising as a tuna long-lining ground. Within the scope of the survey, it was judged that the Caribbean side is mainly a yellowfin ground and the Atlantic side principally an albacore and spearfish ground. There were constant northeast winds of about force 3, which hampered operations of the small fishing boat used for long-lining but which would not bother a regular long-line vessel. Since the grounds are close in, operation by smaller vessels is probably quite possible. (Nippon Suisan Shimbun, Japanese periodical, July 31, 1957.)

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FROZEN TUNA EXPORTS TO THE UNITED STATES: Japanese exports of frozen tuna for the first six months of 1957 to the United States amounted to about 53.5 million pounds as compared with 46.3 million pounds for the same period in 1956. The

Japanese Exports of Frozen Tuna to United States, January-June 1957 and 1956, and 12 Months 1956 and 1955

Species	January-June 1957			January-June 1956			12 Months 1956		12 Months 1955	
	Quantity	Value	Declared Value Per Ton	Quantity	Value	Declared Value Per Ton	Quantity	Value	Quantity	Value
	Metric Tons	US$ 1,000	US$	Metric Tons	US$ 1,000	US$	Metric Tons	US$ 1,000	Metric Tons	US$ 1,000
Exports to U. S.:										
Albacore	13,508	4,277	317	7,554	1,727	229	15,335	3,475	V	V
Yellowfin	10,540	2,808	266.41	12,092	3,060	253.06	22,824	5,666	V	V
Bluefin	9	2							V	V
Other tuna	187	42	251.50	305	78	255.74	511	121	V	V
Total exported to U.S.	24,274	7,149	294.51	20,081	5,497	308.23	39,815	12,262	33,071	11,564
Total exported to all countries	29,896	8,521	285.05	26,899	7,102	290.41	51,970	15,496	64,857	17,991
	%	%	%	%	%	%	%	%	%	%
Percentage exported to U. S.	81.2	83.9	...	85.4	81.2	...	76.6	79.1	85.2	89.4

V Not available by species.

declared export value of the frozen tuna exports to the United States in the first six months of 1957 of US$7,149,000 was 10.5 percent higher than the January-June 1956 value of US$6,467,000.

Exports to the United States accounted for 81.2 percent of the total quantity of frozen tuna exported to all countries in the first six months of 1957. The average declared value of US$317 a metric ton for frozen albacore tuna exported to the United States in the first six months of 1957 reflected the weaker American market for the species. For the comparable period in 1956, albacore tuna exported to the United States averaged US$388 a ton. (U. S. Embassy in Tokyo dispatch dated July 31, 1957.)

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GOOD SKIPJACK FISHING OFF NORTHEASTERN HONSHU: With a market boundary between warm and cold currents 180 to 300 miles off the Japanese province of Kinkazan (northeastern Honshu), the skipjack tuna schools are lingering in that vicinity. Landings at the port of Kesennuma July 1-25 were 3,500 metric tons from 98 boats with a boat value of US$390,600. If the albacore landed since May are added, tuna landings at this port amounted to 5,140 tons, worth $638,300, or 30 percent of the value of all fishery landings in Miyagi Prefecture. It is expected that if the cold-water mass retreats or disappears, the schools will come in closer to Kesennuma and that landings will exceed last year's record of 14,042 tons.

Since the changeover from albacore to skipjack fishing in July, the average tuna trip has brought in about 36 tons, worth $4,113. With an average price of $111 a metric ton, this is unprecedentedly good fishing. Trips are running about 10 days, and trip expenses for large boats are about $1,944, so even though the price is low, the operators are all cheerful. The skipjack rush is being aggressively led by the canners and driers, who are consuming 70 percent of the landings. Dried skipjack stick production is particularly active, with groups of part-time producers in the picture along with the regular processors, and it is anticipated that production will reach 8,000 barrels, 1,000 barrels more than in normal years.

Deliveries at the Kesennuma fish market have been good since June, and especially during July when landings of all types of fishery products averaged $27,700 a day.

The skipjack live-bait fleet supplied about 50 percent of the value of the landings at the port, and the rest was supplied by seiners, long-liners, trap fishing, salmon gill-netting, salmon trout long-lining, harpoon boats, and small hand-liners, all enjoying a summer peak season. Tuna seining, which had been slow since the middle of July, picked up again. With the various types of salmon boats ending their operations, and with the "skipjack rush" in full swing, it was expected that the period from the last of July through the early part of August would be the busiest of the year at the port of Kesennuma. (Nippon Suisan Shimbun, July 31, 1957.)

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TUNA LONG-LINE FISHING GEAR AND METHODS: Introduction: The Japanese tuna long-line fishery began its development in the early 19th century in central Japan for the capture of the bluefin tuna migrating along the Japanese Pacific coast. In this fishery, high-priced (in Japan) large fish could be taken with a small amount of capital equipment and the operation of the gear was simple, so the number of fishermen using this method gradually increased. Then, with the development of shipbuilding techniques and the internal combustion engine, the radius of operations was expanded until at present the fishing grounds take in almost the whole world, and the catch comprises all such species as yellowfin tuna, big-eyed tuna, and the spearfishes, which inhabit the middle depths of 100-150 meters (330-500 feet).

However, the main gear of this fishery, the long line, has undergone no radical improvement in the past 200 years. The development of the fishery has been supported only by the increase in the number of units of gear employed and the exploitation of new fishing grounds. If there is any element in the fishing gear which has brought about a great advance in this fishery, it is the invention of the line-hauler. This device made it possible to use more than 3 times as much gear as when hauling by hand and brought about a rapid increase in catching power. There has, however, been no improvement in catching power through any essential improvement of the gear, and under present conditions the fishery is maintained in operation by the heavy labor and low pay of its fishermen. Recently more distant fishing grounds are being exploited, with a consequent necessary increase in the size of the vessels, and thus the cost of production has risen steeply, so that the great problem for this fishery from now on will be how to improve the gear and devise efficient methods of fishing it. I wish, therefore, to center my discussion around this point, in order to discover where there is room for improvement of this type of gear and this fishing method and to seek out the direction of progress and development.

The Construction of Tuna Long Lines: It is believed impossible to capture by seining, trawling, or other such methods tunas which swim at depths of 100-150 meters (330-500 feet). This means that hook-and-line gear must be used, and for this the tuna long line has the efficiency of multiple hooks and the capability of landing large fish. At present this gear varies somewhat in dimensions and in weight of the line and wire of which it is made, according to the species fished, but since it is all the same in principle, we will discuss the construction of the long lines in general use.

This gear is made up of main lines, branch lines, swivels, seizing wire, wire, hooks, float lines, floats, flags, and light buoys, but for the sake of simplifying its operation, 5-6 pieces of main line, 4-6 branch lines, and 1 floatline are taken as a unit or one skate.

LINE: Up to the present time cotton line (20-count 50-55 thread 3 x 3) treated with coal tar has been used, but synthetic fibres such as nylon and vinylon have appeared on the scene, and since it has been proved that their useful life is far longer than that of natural fibers and that they are far superior in tensile strength and resistance to abrasion, they have made astonishing progress despite their high cost, because they can satisfy the demand for fineness of line, which is the essence of hook-and-line fishing.

There remain, however, a number of unsolved problems in the application of these materials to fishing gear, such as specific gravity, coloration, and so forth, but they are being solved one after another by fishing gear specialists, so that the changeover of all the gear to synthetic fibers is probably only a matter of time.

FLOATS: Glass balls are used as floats, but their greatest shortcoming is that when they are broken by some external force during use, the float becomes a sinker and carries the gear down, so that in the worst cases it becomes impossible to haul the lines in. Therefore substitutes are being experimentally manufactured out of aluminum, vinyl, polyethylene, rubber, and other materials, however, so far the problems of water pressure and cost have kept them from taking the place of glass balls.

LEADER WIRE AND SEIZING WIRE: At present galvanized No. 27 wire (diameter 0.42 mm. 3 x 3) is used. Its tensile strength is 180 kg. (396 pounds). This is an important element in the construction of hook-and-line gear, and if it were possible, the use of a clear, colorless material like nylon gut would improve catches, but there is no such material which would give the 180-kg. tensile strength for the same thickness of line. If there were some material which even though opaque could give the same tensile strength with less bulk, it would probably replace the wire.

The seizing wire is No. 27 wire served with No. 4 or 5 vinylon or cotton, but this is being replaced with small-diameter nylon line.

ACTION OF GEAR IN THE WATER: When gear of the construction outlined above is set in the sea, its basic form (with no wind or current) is probably a catenary. That is, with branch lines at 50-meter (164-feet) intervals and a total mainline length of 300 meters (almost 1,000 feet), the depth of the hooks is determined by the number of feet of distance within which the unit of gear is set.

If it were possible to detect with a fish finder the depth at which the schools of fish were swimming (there is as yet no fish finder manufactured in Japan which can pick up individual tuna), the proper setting interval could be decided by applying the direction and force of the current and wind to this basic curve.

In actuality, however, it is extremely difficult to set the line so as to maintain a definite depth, and the gear has a complex form, because of the angle at which it is set in relation to the wind and current and because of differences between surface and mid-level currents, which push the gear one way or the other. Particularly when the wind and current are running in contrary directions and are strong, the fishing depth cannot be reached and catches are poor. Captains of long experience can judge such situations and set their gear accordingly.

Where chemical tubes have been attached to the lines to measure the depth of the gear and at the same time the wind and current speed and direction have been measured to calculate the degree to which the lines are streamed out, the calculated results have in many cases not agreed with the actual measurements, but this is probably because of differences between the surface and deeper currents. However, if the lines are streamed out to some extent by the current, while maintaining an appropriate depth, they take on the form of trolling gear, and this is probably the ideal situation.

According to past catch records, the branch line in the middle of the main line produces the highest catch rates. Other lines which stream out in the same direction as the main line are interfered with by the latter, and their catch rates are thereby lowered. Consequently, there is a need for a high degree of expertness on the part of the captain in deciding on the direction in which to set his gear in accordance with the prevailing sea conditions, and this is one of the greatest drawbacks of this type of gear.

If it were possible to detect the depth at which the fish sought were actually swimming at the time, and if the depth at which the gear was hanging could be accurately known, or if the depth of the gear could be easily and quickly adjusted, there would naturally be a great and sudden increase in the effectiveness of this gear, but at present no such improvements are being carried out.

SELECTING FISHING GROUNDS AND TRACKING THE SCHOOLS: The most reliable basis for selection of fishing grounds is that of ascertaining the actual presence of fish, that is, sighting them at the surface or detecting them under the water with a fish finder. However, we do not at present have any device capable of detecting tunas swimming at mid-depths, so right now the selection of tuna fishing grounds is done as follows:

There are statistical data for the approximate selection of fishing grounds, however, the systematic compilation of effective statistical information has been carried only for the past 2 or 3 years and it is still inadequate. Therefore, in most cases the role of statistical data is filled by each individual's experience or by reports heard from other fishermen. What is known is known in only an extremely approximate way, and the concrete question of where to set gear, in the absence of reports from other boats, can be answered only after arriving in the area and giving it a try. As more sharply-focused methods of fishing ground selection, such things as water temperature, water color, currents, bottom topography, birds, and radio reports of other boats are studied closely for several days preceding the vessel's arrival in the area of operation, and if records or memories of experience on the ground are available, they are referred to. As far as water temperature is concerned, almost all tuna boats take surface temperatures, but very few of them measure the temperature of the middle depths. For estimating the depth of the schools, however, determination of mid-depth temperatures supplies powerful data. To take only the surface temperature and then judge that a particular area contains a zone of water suitable for the occurrence of tunas and spearfishes is to jump to conclusions (although of course it may be of some value as an indicator). The significance of continuous measurements of surface temperature is rather to detect changes and thus discover current boundaries. The reason for this is that the tunas, other than those resident on shoals, often tend to accumulate on one side of a surface of contact between different water masses. Consequently, it must be noted that a rapid grasp of the pattern of ocean currents in the area will be reflected directly in the amount of the catch. As for water color and transparency, if we take into account the development of plankton, it is natural that an area with water color of 3-4 on Forel's scale and low transparency should be a better fishing ground than an area with water color of 1-2 and high transparency; however, places with very bad water color are said, on the other hand, to produce poor catches. This is because the occurrence of large numbers of fish and the catching of large numbers of fish are different matters, particularly in the case of hook-and-line gear. This can be granted, I think, if we consider such matters as feeding reaction and range of visibility. Ocean currents, as stated earlier, have an important significance. It is especially essential to get a firm grasp of their boundaries. For this reason the captains of tuna boats go to much trouble dropping drift bottles and following them for hours, using current direction and velocity meters, and checking their drift by celestial navigation in order to get an accurate knowledge of ocean currents and tidal currents.

Location of fishing grounds by the bottom topography and in relation to islands is often done, and since this places the ground firmly in a definite area, once a good ground is discovered, the boat has only to return to the same position again. This is therefore the easiest method of fishing ground selection. It can, however, easily give rise to loss of gear, danger to the vessel, and problems of territorial waters, so it requires minute care in ship handling and fishing operations. Sea birds are an important indicator, . . . and . . . it is said that tuna are certain to be present in areas where many birds are flying.

Putting all of these things together, the tactical selection of the fishing ground is made, but since the gear is not set on the basis of sightings of tuna schools, it probably rarely happens that the schools are encountered on the first set. If the fishermen take a certain point as a center and set their gear in different directions from it over a period of 4 or 5 days, they will be able to judge the sea conditions and the fishing conditions over an area about 70 miles square, and if they then work gradually in the direction that seems most promising, they will end up making a section of observations across an area of about 150 miles. If while searching in this manner they encounter the schools, they begin to follow them. However, with this type of gear this pursuit of the schools is a most difficult and tricky business. If it were possible to track the schools with certainty, it would be unnecessary to make sets of 400 skates of gear over a distance of 35-40 miles, as is the practice at present, and this would be a radical improvement in the fishing method, but there is as yet no certain method for tracking the schools. The simplest method of following

the schools is to set the gear again at the geographical location where the catch was best on the previous day's set, and by repeating this process to get an estimate of the situation. This is the method used on resident fish or when it is not possible to figure out the direction of movement of the schools. Another method is to hypothesize that the larger fish precede or head the movements of the schools and that the fish move against the current while feeding and are carried with the current while resting; by this method the direction of movement of the schools is judged by the size of the fish taken, the location of capture, and the direction and speed of the current. This method fits comparatively well in the case of schooling migratory tunas, but it still presents many doubtful points. Another clue to the size and direction of movement of the school is to take the changes in catch rates along the various parts of the set as a measure of the density of the school, since the density of a school becomes lower toward its rear. Whether the fish are found alive or dead on the lines can also similarly play an important role in deducing the direction of movement and the location of a school.

METHOD OF USING THE GEAR AND THE FISHERMEN'S LABOR: In discussing the method of using this gear, explanation of the details will be omitted, and the discussion will take up mainly the handling of the vessel.

When the boat is hove-to on what, by the methods outlined in the preceding section, is estimated to be a good ground, the setting of the lines is begun around 3 o'clock in the morning. This is because the feeding reaction of fishes is most pronounced at such times as sunrise and sunset, at the change of the tidal current, or when sea or weather conditions change. Line setting is done in accordance with the factors mentioned earlier. Once the line is set, it is left to soak for 2 or 3 hours, and then line hauling is begun. With expert hands this operation is carried on at the rate of about 4 minutes per basket. At this time great skill in handling the boat is required; when the weather is bad, it is especially difficult and great demands are made on the engine, which is often the cause of breakdowns. Furthermore, the expertness or lack of it in this operation has a bearing on the working life of the long lines, and on the occurrence of mainline breaks and the loss of hooked fish. An experienced crew will not leave off fishing or cut down the amount of gear fished up to wind forces of about 5.

About 19 men are required in setting the gear. The boat steams at 8-9 knots while the line is set from the stern, setting being finished in about 4-5 hours. The speed of setting is related to the depth of the gear. Line hauling is done using all hands. The hauling of the lines requires 12-14 hours, and when there are line breaks or the catch is heavy, the work frequently continues through the night. Once line hauling is completed, setting starts again after 1 or 2 hours.

When fishing is poor, boats sometimes keep on operating for as long as 40 days.

The working hours of the crew are 6 hours for line setting, and 13 hours for hauling, a total of 19 hours, and if 1 hour is added for meals and so forth, about 3 or 4 hours are left for sleep. As such labor is done continuously, the fishermen are terribly fatigued by the end of a trip, and frequently their health is damaged. Consequently, men can engage in this work only up to about the age of 40.

The compensation for this labor averages 29,000 yen (US$80) a month, and when taxes and cost of working clothes are subtracted, this leaves a monthly income of 25,000 yen ($70). The captain receives 3 times as much as an ordinary fisherman and the chief engineer about 2.5 times as much.

In 1956 the average monthly income of regularly-employed workers in Japan was 20,669 yen ($57), and for miners the figure was 20,465 yen (less than $57). By comparison the pay of tuna long-line fishermen is very low in view of their working conditions.

In foreign countries the income of maritime workers is generally considered to be about twice that of workers ashore, but the Japanese fisheries are peculiar in this respect, and this is one of the problems to be faced in the future.

BUSINESS CHARACTERISTICS OF THE TUNA LONG-LINE FISHERY: Next I will take up briefly the peculiarities of tuna fishing as a business.

After World War II Japan was very short of food, particularly animal protein, and the government took special financial and other measures for the promotion and protection of the fisheries, especially the tuna fishery, which was regarded as an alternative to the North Pacific salmon fisheries and the Antarctic whaling. As a result the number of operators engaged in this fishery increased by leaps and bounds, but this has brought about declining prices and at present it is by no means a profitable fishery.

Let us look at the actual situation of a 350-ton vessel in 1956. This boat was completed in August 1953 at a cost of 78 million yen (US$216,000), and by the time she was ready to begin fishing the cost was up to 82 million yen (US$227,000). This boat made four trips in the 446 days between November 9, 1955, and January 28, 1957. Total trip time was 375 days, and 71 days were spent in port. The total value of the catch during this period was 59,753,265 yen ($165,981), which averages out to 306 yen per kan ($227 a metric ton). During this time expenditures totaled 70,586,874 yen ($196,075), leaving a deficit of 10,833,609 yen ($30,009).

This vessel operated without any trouble, and fish prices received were slightly higher than the 1956 national average of 304 yen ($227 a metric ton).

It is clear that under these conditions this fishery has no future, and it can be seen that we must try to maintain the fishery by broadening the market for tuna, by getting the price of fish up to around 350 yen per kan ($257 a ton), and by shortening trip time through raising the efficiency of the gear.

From the fact that fuel cost is 67.1 percent of operating expenses, it can be seen how greatly the distance to the grounds has increased, and it can also be seen that cutting down the fuel cost might be one way to stabilize this fishery. Therefore it can be said that the unavoidable fate of this fishery is to change to mothership-type operations or to operations based in foreign countries. However, for these types

Japanese Operating Costs of a 350-ton Long-liner in 1956	
Market charges	$ 8,503.50
Fishing gear	6,424.40
Fuel cost	30,081.50
Expendables (ice, bait, vessel equipment)	8,328.70
Provisions	4,156.10
Improvements to vessel	31,268.70
Repairs	9,766.40
Fishermen's pay	39,248.60
Insurance	14,065.00
Vessel amortization	37,637.90
Taxes and public charges	2,733.70
Business expenses ashore	3,409.40
Miscellaneous expenses	450.80
Total	$196,074.70

of operations much capital is required, and the natural result will be for the industry to be absorbed by big capitalists. This problem is one that is already with us, for such capitalists already have three mothership-type fleets in operation and foreign bases are being used in American Samoa, at Recife in Brazil, at Colombo in Ceylon, and elsewhere.

OUTLOOK: The foregoing is a general account of the tuna long-line fishery. From the standpoint of fishing gear development, there is room for study to determine to what extent the operation of the gear can be simplified, but in view of the essential character of hook-and-line gear, there will probably be no fundamental change in the long line.

In the United States at present they are using snaps and removing the branch lines from the main line, putting 10 branch lines on each basket, reeling in the main lines on drums, and so forth. These changes are being studied in Japan, but have not as yet been put into actual use. After all, this gear and the fishing method have been handed down as a traditional skill for 300 years, and although there have been partial improvements during that period based on experience, there has been no scientific study combining the knowledge of oceanography, ichthyology, and gear materials technology.

At this time, when the food preferences of the world's peoples are shifting from meat to fish, there is bound to be an increase in the consumption of fish in all nations, and there is a high possibility that this fishing method will be developed in various foreign countries as a way of capturing deep-swimming tunas. In Japan the fishery is faced with business difficulties because of the effect of the distance to the fishing grounds on the cost of production and because of the failure

of fish prices to balance these costs, but if this fishery is operated in other countries, it can be a very promising enterprise because of the short distance to the grounds, provided adequate shore facilities can be installed and ways can be found to maintain the price of fish.

However, if tuna long-lining is adopted as a commercial fishery in foreign countries, the problem will be to adapt the gear so that it can be efficiently used by foreign fishermen, just as foreign systems of fishing introduced into Japan have been revised so as to make them easy for Japanese to use.

--BY MITSUO NAGAI, DIRECTOR, KANAGAWA PREFECTURE FISHERIES EXPERIMENT STATION, TUNA FISHING, NO. 42, 1957, PP. 27-32. TRANSLATED FROM JAPANESE BY W. G. VAN CAMPEN.

Mexico

PACIFIC COAST SHRIMP FISHERIES TRENDS, THIRD QUARTER 1957: After a closed season of two months (May and June), it took some time for the shrimp fishing industry on the Mexican west coast to get back into normal production. For the states of Sonora (includes the important port of Guaymas) and Sinaloa (includes the ports of Topolobampo and Mazatlan), July, August, and September shrimp fishing was only fair as compared with past seasons, when the average trip was about 4,400 pounds as against 900-1,500 pounds a trip during this quarter. There was an increase in ex-vessel prices during the quarter.

The industry is reported to have defeated an attempt to impose a longer closed season in the spring. In 1958 the closed seasons will move from spring to summer.

A new all-Mexican distributing group has been established in San Diego. It includes Guaymas and Topolobampo representation and is expected to effect great savings by direct marketing. The improved railway service now available will soon be used instead of trucks for shipments out of Mazatlan with a reduction in shipping costs. A new ice plant has been completed in Mazatlan and a new freezer is being constructed.

The industry is reported eager to establish an institute on the west coast of Mexico for the scientific study of shrimp migrations and plans to ask the assistance of a private and independent United States organization to conduct the research.

A survey predicts good but not heavy shrimp fishing for the coming season in the bays of Southern Sonora and off Sinaloa. Fishing prospects offshore have not proved good. (United States consular dispatch from Nogales, September 13, 1957.)

Morocco

AGAR-AGAR PRODUCTION AND EXPORTS: The only manufacturer of agar-agar in Morocco produces about 150 metric tons of flakes and powder. For the first five months of 1957, the United States was the leading importer of agar-agar from this manufacturer with about 53,900 pounds out of total exports of 131,000 pounds. The value of the exports to the United States was about US$72,000 and the value of all exports by this manufacturer was about US$170,000. In addition to the exports of refined (flakes and powder) agar-agar, about 282,400 pounds (value US$14,710) of semi-processed algae were exported by this firm during January-May 1957--the United States received 48,395 pounds out of this total

Exports of agar-agar by this manufacturer to other countries for the first five months of 1957 follow: Great Britain, 17,600 pounds; Argentina, 14,740 pounds; Netherlands, 9,240 pounds; Italy, 8,450 pounds; France, 5,940 pounds; Denmark, 1,100 pounds; Switzerland, 660 pounds; Belgium, 240 pounds; and Austria, 50 pounds.

Exports of semi-processed algae to countries other than the United States by this manufacturer during January-May 1957 were: Italy, 40,610 pounds; Spain, 39,158 pounds; and West Germany, 200 pounds.

Stocks of finished agar-agar as reported by this manufacturer as of August 5, 1957, totaled 34.68 metric tons.

The amount of algae or gelidium to be found on Moroccan beaches is subject to variation due to changing winds and tides, but it is estimated that an annual supply of 5,000-10,000 tons is a conservative estimate.

Moroccan Stocks 1/ of Finished Agar-Agar as of August 5, 1957

Type	Packed for Export	In Bulk	Total
	..... (Metric Tons)		
Flake	3.80	4.28	8.08
Powder:			
Very fine ...	4.50	15.70	20.20
Medium fine .	-	1.70	1.70
Fine	1.00	3.70	4.70
Total	9.30	25.38	34.68

1/ INCLUDES ONLY THE STOCKS REPORTED BY THE MANUFACTURER LOCATED IN MOROCCO.

In addition to the one manufacturer in Morocco, there is also a firm of textile merchants which has an arrangement with a large manufacturer of agar-agar in Madrid whereby they supply the Madrid firm with Moroccan gelidium and receive as payment in kind a portion of the finished agar-agar produced from the raw material. The Moroccan firm of textile merchants disposes of the agar-agar locally or re-exports it. In May this Moroccan firm is reported to have sent 750 metric tons of gelidium to the Madrid manufacturer and received 70 tons of agar-agar in payment.

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SARDINE FISHERMEN DUMP UNSALEABLE CATCHES: Hundreds of tons of sardines were thrown back into the sea in Morocco when fishermen could not find buyers. The by-products factories which buy the fish not taken by the canners offered too low a price, and the fishermen preferred to throw the fish back. The factories were overloaded with fish and were not very interested in buying more fish, points out World Fishing of July 1957.

Netherlands

FISHERY EXPORTS IN 1956: Although production of cured herring was less in 1956 (773,957 barrels as compared with 951,069 barrels in 1955), Dutch total fish exports reached 148,000 metric tons as compared with 146,800 tons the previous year. Total exports of fresh herring amounted to 17,250 tons (12,398 tons in 1955). This was in keeping with increased landings of fresh herring which rose by 2,000 tons to a total of 41,000 tons in 1956. An increasing proportion of herring is exported in filleted form.

Exports of fresh sea fish in 1956 rose to 14,500 tons as compared with 12,812 tons in 1955, reflecting a rise in landings (46,579 tons in 1956, 43,742 tons in 1955).

Exports of shrimp rose sharply from 2,844 tons in 1955 to 3,100 tons in 1956. Main buyers for peeled shrimp were Belgium, France and England. Principal markets for unpeeled shrimp were France and Belgium. The total catch of shrimp (5,930 tons in 1956), however, was 440 tons less in 1956 than in 1955. A total of 20 million oysters were exported in 1956 (against 19.7 million in 1955). Exports to West Germany were increased when that country's previous 30 percent ad valorem import duty was abolished. (Fisheries Newsletter, August 1957, of the Australian Commonwealth Director of Fisheries.)

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REVIEW OF THE FISHERIES, 1956: The total quantity of fish marketed in the Netherlands in 1956 was 582.4 million pounds with a landed value of 102.4 million guilders (US$26.8 million). Of this 532,000 pounds was fish caught by foreign vessels. Sea fisheries accounted for about 62 percent of the total, and coastal fisheries for 32.5 percent.

The herring drift-net fisheries delivered 162.8 million pounds, or 45 percent of the total quantity of fish caught by sea-going vessels.

Ijmuiden landings of all types of fish totaled 197.3 million pounds, and Scheveningen, 127.6 million pounds with a landed value of 23.4 million guilders (US$6.1 million).

Small trawlers operating in the North Sea marketed 6.6 million pounds more fish than in 1955.

The annual report of the Netherlands Association of Herring Traders remarked that the quantity of fish marketed during the 1956/57 season was the second lowest of the postwar period.

NOTE: VALUES CONVERTED AT THE RATE OF 1 GUILDER EQUALS US$0.2612.

Norway

COD FISHERIES TRENDS TO JUNE 22, 1957: Spawning cod and young cod landings in Norway this year for all areas through June 22 amounted to 110,424 metric tons as against 163,046 tons last year and 128,190 tons in 1955 during the same period, points out the June 27 issue of Fiskets Gang, a Norwegian fishery periodical. Of the amount landed, 60,917 tons were sold for drying, 37,292 tons for curing, and 12,235 tons as fresh fish. In addition, 4,493 tons of cod-liver oil were produced, 2,547 tons of cod roe were salted, and 1,075 tons of cod roe were sold for canning or the fresh trade.

The Finmark young cod fishing ended as of June 22 and cod landings amounted to 52,437 tons as compared with 53,562 tons last year and 46,767 tons in 1955.

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FISHERIES ECONOMY STUDY TO BE INITIATED: The Norwegian Government early in September named a 4-member committee to study possibilities for establishing a profitable fishing industry on a permanent basis and to suggest measures that might be indicated to achieve such a goal. Appointment of the study group came in the wake of extended conferences between the Government and representatives of the major organizations of fishermen.

The committee will investigate whether the fisheries now being exploited are the most profitable for the national economy, and whether the present compostion of the fishing fleet is suitable for that purpose. In this connection, the committee is to give its views on corrective measures that might be carried out, as well as evaluate whether investments in the fishing industry should be increased.

The committee has been requested to evaluate whether sales, processing, and export of cod and cod products are handled in a rational and efficient manner, and whether prevailing controls are suitable. In its instructions to the committee, the Government notes that export arrangements should assure efficient and active sales promotion, and that the objective of any price system should be to develop an advantageous policy for the export of fish and fish products. The committee has also been charged with evaluating prevailing arrangements for State guarantees and subsidies to fishermen. Moreover, it will be expected to take a stand on the necessity of temporary State support to Norway's fishing industry. The over-all goal, however, is to work out a permanent solution for establishing the industry on a profitable basis.

A fisheries conference in Oslo August 28-September 2 was called at the urgent request of the fishermen's cooperative sales organization, the trade association, and representatives of the provincial fishermen's associations. At a meeting last summer, these groups also made a strong bid to have the Government guarantee prices and sales of their catch.

At the end of the talks in Oslo this year, the Government pledged prompt action to explore ways and means of establishing the fishing industry on a permanently profitable basis. Moreover, if extraordinary measures are needed to relieve the most pressing difficulties within the industry, the Government promised to propose such measures when the new Parliament convenes in January 1958. Meanwhile, the extraordinary 5 öre per kilo (6.4 U. S. cents a hundredweight) Government subsidy paid to fishermen, scheduled to expire October 1, was to be extended to December 31, 1957. And starting January 1958, the price of fuel-oil types used by fishermen will be reduced.

According to a joint communique, the Government agrees that Norway's cod fisheries are not yielding adequate profits at present export prices. At the same time, it is not convinced that the remedies urged by the fishermen's organizations offer either the best or the only solution to the problem, reports a September 12 news release from the Norwegian Information Service.

Peru

FISH CANNING TRENDS, JULY 1956-JUNE 1957: Peruvian fish canners report that the past fishing year (July 1956-June 1957) was satisfactory. It began exceptionally well but was cut short by a shift in ocean currents. Canners disposed of their packs at satisfactory, though declining, prices, states an August 15 dispatch from the United States Embassy in Lima. They are concerned over the likelihood of severe competition from Japanese canned tuna in European markets during the coming season and, to a lesser degree, over the possible return of salmon to European markets, and over the increasing competition of South African fisheries, particularly under the European common market plan.

Portugal

CANNED FISH EXPORTS, JANUARY-MAY 1957: For the first five months of 1957, canned fish exports amounted to 17,143 tons (1,371,400 cases), valued at US$10.9 million. Sardines in olive oil exported during the first five months of 1957 amounted to 11,193 tons (895,500 cases), valued at US$7.1 million (Conservas de Peixe, July 1957).

During January-May 1957 the leading buyers of canned sardines in olive oil were: Germany, 1,927 tons (valued at US$1,222,000), Great Britain 1,492 tons (US$906,000), France, 1,441 tons (US$900,000), Italy 913 tons (US$555,000), British West Africa 896 tons (US$555,000), and Belgium-Luxembourg 770 tons (US$472,000). These countries purchased 66 percent of the quantity and 65 percent of the value of all Portuguese exports of canned sardines in olive oil.

Exports of sardines in olive oil for the first five months of 1957 to the United States amounted to 524 tons (valued at US$420,000), while exports to the Philippines totaled 235 tons (US$148,000).

Table 1-Portuguese Canned Fish Exports, January-May 1957

Product	January-May 1957	
	Metric Tons	US$ 1,000
Sardines in olive oil	11,193	7,076
Sardinelike fish in olive oil	2,568	2,105
Sardines & sardinelike fish in brine	1,015	253
Tuna & tunalike in olive oil	533	462
Tuna & tunalike in brine	103	70
Mackerel in olive oil	1,227	733
Other fish	504	238
Total	17,143	10,937

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Portuguese Canned Fish Exports, January-July 1957

Product	January-July 1957	
	Metric Tons	US$ 1,000
Sardines in olive oil	15,600	9,633
Sardinelike fish in olive oil	3,045	2,444
Sardines & sardinelike fish in brine	1,114	277
Tuna & tunalike in olive oil	1,134	946
Tuna & tunalike in brine	245	144
Mackerel in olive oil	2,167	1,233
Other fish	666	295
Total	23,971	14,963

CANNED FISH EXPORTS, JANUARY-JULY 1957: For the first seven months of 1957, canned fish exports amounted to 23,971 tons, valued at US$15.0 million. Sardines in olive oil exported during the first seven months of 1957 amounted to 15,600 tons, valued at US$9.6 million (Conservas de Peixe, September 1957).

During January-July 1957 the leading buyers of canned fish were: Italy, 3,592 tons (valued at US$2,214,000); Germany, 3,461 tons (US$2,122,000); France, 2,237 tons (US$1,404,000); Great Britain, 2,234 tons (US$1,376,000); and the United States, 2,136 tons (US$1,872,452). These countries purchased 57.0 percent of the quantity and 60.0 percent of the value of all Portuguese exports of canned fish. Exports of sardines in olive oil for the first seven months of 1957 to the United States amounted to 785 tons (valued at US$661,000), and 1,046 tons of anchovies (valued at US$1,043,826).

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FISHERIES TRENDS, JULY 1957: Sardine Fishing: During July 1957, the Portuguese fishing fleet landed 7,556 metric tons of sardines (valued at US$1,184,382 ex-vessel, or $157 a ton). In July 1956, a total of 5,651 tons of sardines were landed with an ex-vessel value of US$906,000.

Sardines purchased by the canneries during July amounted to 4,504 (59.6 percent) tons (valued at US$753,913 ex-vessel or $167 a ton). Only 49 tons were salted, and the balance of 3,003 tons, or 40 percent of the total, was purchased for the fresh fish market.

Other Fishing: The July 1957 landings of fish other than sardines consisted of 2,768 tons (value US$464,139) of anchovy and 4,953 tons (value US$238,991) of chinchard. (Conservas de Peixe, September 1957.)

Thailand

REVIEW OF THE FISHERIES, 1947-57: Substantial progress has been made by the Thai fisheries industry during the past decade. Mechanized boats increased from 121 in 1947 to 1,082 in 1956; the quantity of gear in use in the Gulf of Thailand increased from 4,148 in 1947 to 11,439 in 1956; the annual catch increased from 154,000 metric tons in 1947 to almost 213,000 tons in 1956; exports of salted fish soared from 2,882 tons to almost 20,000 tons in the same period; while the value of

the annual catch has risen from 556 million baht (US$26.7 million) in 1950 to 976 million baht (US$46.8 million) in 1955. The Government's program of stocking inland waters has likewise progressed remarkably--the number of fish being distributed to ponds and lakes increased from 112,000 in 1947 to about 6 million in 1956.

Although the Gulf of Thailand has yet to be thoroughly surveyed for its potential commercial value, experts believe that on the basis of present catch from peripheral areas the entire Gulf holds great promise. The Japanese are already at work in the Indian Ocean off the West Coast of Thailand and have sent in vessels, equipment, and experts to develop the continental shelf which is about 60 miles off the coast.

The Department of Fisheries has plans for the continued development and improvement of the entire fisheries program. This includes marine fishing, training, and equipment aid to fishermen, building of cold-storage plants, processing plants, wharfs, jetties, etc., and an educational indoctrination program to increase fish consumption. It is hoped that per capita consumption, which is now about 20 pounds per annum, can be raised to about 35 pounds per annum. The chief obstacle in the way of these plans is financial; the Budget has not yet provided for some 60 million baht (US$2.9 million) needed for initial development or even a yearly subsidy of 10 million baht (US$480,000) asked for by the Fisheries Department. It is unlikely, therefore, that the Fisheries Department plans will be wholly realized.

The cold-storage plant at Bangkok has not been as successful as anticipated. A combination of high storage fees and the difficulty of changing fish marketing customs seems to be responsible for the disappointing result. (United States Embassy dispatch dated August 21, 1957, from Bangkok.)

NOTE: VALUES CONVERTED AT THE RATE OF 1 BAHT EQUALS US$0.048.

Turkey

FRESH AND FROZEN BONITO EXPORTS: Turkey exports considerable amounts of fresh, chilled, and frozen pelamid and bonito (Latin name for both varieties is Sarda sarda). Year after year there appears to be wider demand for bonito.

Turkey's Exports of Fresh and Frozen Bonito, 1955, 1956, and First Quarter 1957, by Country of Destination

Destination	First Quarter 1957			1956			1955		
	Quantity	Value		Quantity	Value		Quantity	Value	
	1,000 Lbs.	TL 1,000	US$ 1,000	1,000 Lbs.	TL 1,000	US$ 1,000	1,000 Lbs.	TL 1,000	US$ 1,000
East Germany	15.4	3.7	1.3	-	-	-	-	-	-
Federal Germany	-	-	-	13.2	2.7	1.0	.5	.2	.1
Austria	52.8	9.5	3.4	184.1	37.0	13.2	11.0	2.1	.8
Czechoslovakia	202.4	48.1	17.2	445.1	117.6	42.0	176.0	40.3	14.4
France	330.0	79.6	28.4	149.6	25.5	9.1	-	-	-
Bulgaria	716.1	131.0	46.8	3,087.9	828.9	296.0	1,014.9	228.4	81.6
Italy	4,464.2	787.7	281.3	14,523.0	2,770.4	989.4	7,406.3	1,783.7	637.0
Hungary	-	-	-	-	-	-	121.0	33.1	11.8
Poland	-	-	-	15.4	4.5	1.6	-	-	-
Rumania	1,138.3	260.3	92.9	2,990.5	689.9	246.4	2,843.8	592.9	211.7
Yugoslavia	2,002.0	484.6	173.1	4,711.2	1,197.8	427.8	3,379.1	910.7	325.2
Greece	3,951.7	1,238.0	442.2	17,037.3	5,675.2	2,026.9	8,450.6	2,694.5	962.3
Israel	-	-	-	220.0	70.0	25.0	68.2	22.1	7.9
Syria	-	-	-	4.3	.9	.3	-	-	-
Lebanon	-	-	-	6.1	1.2	.4	2.1	.6	2
Morocco, Algiers, Tunisia	-	-	-	149.6	40.8	14.6	-	-	-
Total	12,872.9	3,042.5	1,086.6	43,537.3	1,462.4	4,093.7	23,473.5	6,308.6	2,253.0

NOTE: VALUES CONVERTED AT RATE OF 2.80 TURKISH LIRAS EQUAL US$1.

During 1955 the exports of pelamid and bonito amounted to 23.5 million pounds while during 1956 they rose to 43.5 million pounds.

Turkey exports also in considerable quantities salted, dried, and smoked pelamid and bonito. In addition there are also possibilities for export of canned bonito. (An October 1 letter from Et ve Balik Kurumu Umum Mudurlugu.)

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CLARIFICATION OF FISH NAMES IN ARTICLE ON "FISHERIES OF BLACK AND MARMARA SEAS:" Additional information has clarified the names of some of the fish mentioned in the article "Fisheries of Black and Marmara Seas" which appeared in the June 1957 issue of Commercial Fisheries Review (pp. 56-62).

Fish Mentioned in Article	Common Name	Turkish Name	Scientific Name
Bonito	Bonito	Pelamut baligi	Sarda sarda
Bluefin tuna	Bluefin tuna	Orkinos	Thunnus thynnus
Spanish mackerel	Jacks	Istavrid	Caranx trachurus
"Lufer"	Bluefish	Lufer	Pomatomus saltatri
Anchovies	Anchovies	-	-
Blue mackerel	Mackerel	Iskumru	Scomber scomber
"Torik"	Skipjack or striped tuna	Torik	Katsuwonus pelamis
"Palamut"	Bonito	Pelamut baligi	Sarda sarda
Green mackerel	Thimble-eyed mackerel	Kolyos or kolyoz	Scomber colias
Sardines	Pilchard	Sardelya	Clupea pilchardus
Sturgeon	Sturgeon	Mersin baligi	Acipenser sturio
Red mullet	Red surmullet	Barbunia or barbanya	Mullus surmuletus

U. S. S. R.

ANOTHER LARGE TRAWLER LAUNCHED IN GREAT BRITAIN: The 16th of 20 Arctic trawlers being constructed by a British shipyard for Russia was launched on July 31, 1957. This trawler was launched 30 days after the 15th had been launched, points out the August 9 issue of The Fishing News, a British fishery periodical.

These trawlers, almost 190 feet in over-all length, have a loaded displacement of about 1,300 tons, and are specially constructed for Russia to meet Arctic conditions.

* * * * *

EXPANSION OF NORTH SEA FISHING OPERATIONS PLANNED: Russian plans to concentrate more attention on North Sea fishing have been prepared by the Baltic Research Institute of Oceanography.

A North Sea study group was formed last year and charged with preparing recommendations for the development of commercial herring fisheries in the North Sea. Attention is also being paid to the possibility of off season herring fishing.

Soviet biologists are planning research at different seasons in the northern and central areas of the North Sea, including the Norwegian shelf, the Orkneys, and the Hebrides--and closer cooperation with Norway is envisaged.

Up to now, Russia's main source of herring catches has been the North Atlantic, but for many reasons--the concentration of vessels among them--the North Atlantic has been producing uneven results.

Over a year, Atlantic catches are higher, but there are certain times, such as last April, when the North Sea is more rewarding. Soviet summer catches near the British coasts have been practically equal to those of the North Atlantic, yet North Sea fishing methods have yet to be improved.

Maps showing the 1957 concentrations of herring are being prepared. Migrations covering the North Sea and the English Channel are being studied. Different depths of shoals during the whole year will be recorded, together with the sources of food. And water and weather influences on distribution and behavior of herring will be noted.

Much of this work--meteorological and biological--has been done in the current season in the main North Sea fishing areas.

Early spring concentrations of herring were confirmed along the Norwegian shelf, where the fish arrive from the Northwest. This offers good prospects of catches at the end of winter and the beginning of spring.

During June and July, exploratory trips established that, north of the 59th parallel, herring concentrations justifying commercial operations were found only at the sea bottom.

A special Soviet delegation representing Baltic, Latvian, and Polar branches, recently visited Gdynia to exchange information on research in Baltic, North Sea, and Atlantic fisheries with the Polish Fisheries Institute.

Exchange visits of experts and research vessels have been suggested between Russia and Norway. As their fishermen operate for the same categories of fish in the same areas, it is felt that reciprocal research would be of advantage to both nations in increasing catches of herring and cod.

Soviet expansion in Far East fishing is also outlined in a recent report given by the North Korean Deputy Premier during a meeting of the Korean Communist Party's central committee.

It is expected that this year's herring catches will be double those of last year.

International cooperation is centered in the Commission for Research in Fisheries in the Western Pacific. The commission ended its second session in Moscow on August 22. It includes representatives of Russia, China, North Korea, and Vietnam. Member states have pooled experience in breeding various kinds of commercial fish. A plan has been prepared for marine research in the areas of the Japanese, the Yellow and the East Chinese Seas. (The Fishing News, September 6, 1957.)

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ULTRAVIOLET LIGHT FOR UNDERWATER PHOTOGRAPHY: Russian scientists have developed an ultraviolet searchlight for use with underwater television and film cameras to observe and photograph fish in their natural surroundings.

Previously powerful lights were used which, while they attracted some fish, frightened away others from the deeper parts of the ocean where no light penetrates. The Russians are using a bathysphere for photographing underwater life. (Fisheries Newsletter, August 1957.)

United Kingdom

FISHERY SUBSIDIES CONTINUED: The British Government announced that they propose to keep the rates of the white fish subsidy unchanged, but to increase the rates of the herring subsidy. This is the effect of two schemes which the Secretary of State for Scotland and the Minister of Agriculture, Fisheries and Food laid before Parliament recently. The schemes have to be approved by both Houses of Parliament.

The white fish subsidy scheme provides for a continuation of the white fish subsidy at the current rates for the 12 months to July 31, 1958. These rates have been in operation since August 1, 1956. For vessels between 70 and 140 feet in length, and for seine-net vessels which normally make voyages of more than 7 days, the subsidy takes the form of a fixed payment, varying according to the size and type of vessel, for each day at sea. For vessels of 70 feet and under, it takes the form of a flat-rate subsidy of 8d. (8.8 U. S. cents) per stone (14 pounds) of fish landed (6d. or 6.6 U. S. cents for ungutted fish). The new scheme removes the limit of 300 days at sea previously set for which a vessel could claim subsidy in any one year.

The herring subsidy scheme provides for payment of the herring subsidy for the 12 months to August 31, 1958, at increased rates. The landings subsidy paid to vessels under 40 feet in length is increased from 3d. to 3½d. (3.3-3.85 U. S. cents) per stone (14 pounds) of fish, and the rates per day at sea paid to larger vessels will vary from £6 10s. (US$18.20) for motor vessels of 40-80 feet, to £10 (US$28) for steam vessels not exceeding 140 feet.

Under the White Fish and Herring Industries Acts of 1953 and 1957, the white fish and herring subsidies may be paid up to 1961, with the possibility of extension to 1963. The subsidies are intended to tide the industry over the difficult period of adjustment while the near- and middle-water and inshore white fish industry is placed on an economic footing with the aid of grant and loans for the modernization of the fleet and the replacement of obsolescent coal-burning vessels. The herring subsidy was introduced last May to provide herring vessels with broadly comparable assistance to that already given to white fish vessels.

In fixing the rates of subsidy for the coming year, Ministers have had regard both to the economic position of the industry and to the fundamental objective of establishing an economic fleet capable of standing on its own when the present arrangements for exchequer assistance are due to end. (World Fishing, August 1957.)

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, OCTOBER 1956 P. 64, APRIL 1956 P. 41.

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FISHERY TECHNOLOGICAL RESEARCH, 1956: Freezing Fish at Sea: The British Food Investigation Board, in their report for 1956 (Food Investigations, 1956), comment on the experiments in the freezing and preservation of fish at sea to the effect that from the "tests carried out on a commercial distant-water trawler it has been shown that by using freezing equipment aboard the trawler the market quality of the fish treated in this way can be greatly improved."

It appears, the report adds, that it would be possible to build a trawler of the same size as those now existing that would be more economical in operation. This could be achieved by the incorporation of a freezing plant and a return to propulsive power considered adequate a year or two ago. The freezing plant could become an essential part of the distant-water trawler's equipment. Gradual development of the orthodox Arctic trawler is now a possible alternative to large factory vessels.

Preserving with Antibiotics: "Another promising method of improving the preservation of fish during the journey back to port," the report states, "is the use of very small quantities of antibiotics in the ice in which the fish is stored. Trials which have been carried out on the research trawler Sir William Hardy have demonstrated that certain antibiotics incorporated in the ship's ice supply can result in the quality of the fish landed being greatly improved. The regulations governing the treatment of foodstuffs in the United Kingdom, however, do not at present allow the use of such substances in the preserving ice.

Assessing Freshness: "Methods of assessing the freshness of fish are also being investigated and it is hoped that a simple test can be developed in which the quality of the fish can be determined by the color changes in a strip of impregnated paper laid directly on the fish under examination."

The report states that at present the procedure for measuring the color produced is to wash out the colored substance from the test paper after the latter has been in contact with the fish surfaces for a specific time and then to estimate the color intensity colorometrically. It has been found that differences in the color produced occur at different places on the skin and on the gills of fish during spoilage. The test appears to work as well with flat fish, such as lemon sole and plaice, as with cod and haddock, and has also been applied to smoked white fish with promising results. With fillets the color reactions are different in intensity in a given time from those with the surface of whole fish. Specific standards for fillets will therefore need to be determined.

For testing a large number of samples, for instance, at the fish market, the procedure would obviously be too complicated, and attempts have been made to overcome these difficulties by directly noting the color intensity on the paper. One method has been to use papers containing the tetrazolium salt in a graded series of concentrations along the length of each paper strip. In this case, degree of freshness is shown by the number of concentration bands affected in a given short time. The other method employs a series of uni-

formly impregnated papers with much lower concentration of salt than those used hitherto. Both procedures have given promising results, particularly with spoiling fish at or near the condemnation level. Further work is proceeding.

Handling Fish on Trawlers: Ways of improving the techniques of stowing fish on trawlers are constantly sought. Boxing at sea and stowage in chilled sea water, or a combination of the two, are under consideration. Work on stowage in chilled sea water is at a very early stage.

Investigations of the effect of boxing on the quality of distant-water fish have begun. At the same time a theoretical study has been carried out into the limitations of various designs of boxes and supports in relation to organization in the trawler's hold and to availability of space. If boxing could replace shelfing, more space would be released for a plant to freeze the early part of the catch. On the other hand, if boxing replaces bulking it seems likely that more space will be used.

Fillet Spoilage: A large proportion of the catch is distributed from the ports as fillets. From experiments completed this year it appears that the spoilage behavior of fillets, particularly those taken from whole gutted fish stored in ice for more than a few days, is different from that of the whole fish themselves. For example, although fillets taken from one-day iced haddock and then stored in ice spoiled at about the same rate as the whole fish, fillets taken from 11- and 16-day iced fish spoiled more slowly than the whole fish.

The effect on the spoilage of fillets of such factors as washing in tap water, dipping in solutions of antibiotics (chlortetracycline) or antibacterial agents (1:6 di-4-chlorophenyl-diguanido-hexane and di-n-decyl-dimethylammonium bromide) and wrapping in polythene bags has been studied. The fillets were stored at temperatures ranging from 0° to 15° C. (32° to 59° F.). It was found that washing (for five minutes) extended the storage life significantly over that of the unwashed controls. Of the "dip" solutions, only that containing chlortetracycline (20 p.p.m. for five minutes) was effective in prolonging storage life--by as much as two to three days at 10° to 12° C. (50° to 53.6° F.).

Wrapping did not appear to result in quicker spoilage as judged by chemical and bacteriological tests or by the odor and flavor of the cooked fish. In the raw state, however, the wrapped fish appeared to have stronger odors, but these quickly disappeared after opening the package.

Prepackaging: A recent field survey conducted jointly with the Printing, Packaging and Allied Trades Research Association and a technical officer of the White Fish Authority attached to the Humber Laboratory, has indicated that apart from kippers and kipper fillets, the commercial development of consumer packs of unfrozen fish has so far been very slight.

Earlier work at the Torry Research Laboratory had suggested that the keeping quality of prepackaged fillets at 0° C. (32° F.) was little different from that of unwrapped fillets, and this has been confirmed, states the report, adding that there seem to be no fundamental technical difficulties associated with the prepackaging of fish and no reason why it cannot be combined with the sale of other commodities.

Temperature Conditions at Fish Markets: Temperature conditions on the fish market and at fish merchants' premises have been studied. About 7,000 fish temperatures have been taken on Hull and Grimsby fish markets and at fish merchants' premises on the market and outside. The initial quayside temperature of distant-water fish is generally close to 0° C. (32° F.). No significant difference was found between bulk fish and shelf fish. No temperatures were registered below -1.1° C. (30° F.), at which fish

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Fish can stand on the market for up to 6 to 8 hours after unloading before it is sold, and a survey of the rate at which fish was disposed of at Hull indicated that up to 15 percent can still be unfilleted and uniced even 8 hours after sales commence.

The fish on the outside of a market container rises in temperature faster, so that at any one time there is a considerable variation in the temperatures registered within a stack or even a single container. With an atmospheric temperature of about 18.3° C. (65° F.) the temperature of a fish can be expected to be within the range 0° to 11.1° C. (32° to 52° F.) six hours after unloading and between 2.2° and 15.6° C. (36° and 60° F.) after 12 hours. At Grimsby, where rectangular containers are stacked four or five high, there was a maximum average difference of 3° to 4° F. in the temperatures of fish in different layers. The average temperature of fish before filleting was 5.9° C. (42.7° F.). at Hull where deep tub-shaped containers (kits) are used, and 4.2° C. (39.5° F.) at Grimsby for bulk fish, although for shelf fish, which is not usually stacked so high, it was 6.3° C. (43.4° F.).

After filleting and washing in water, the temperature of which was around 9.5° C. (50° F.) in the summer, fish at both Hull and Grimsby immediately prior to packing in boxes with ice had an average temperature of between 8.9° and 9.4° C. (48° and 49° F.), the average temperature rise during the process varying from 2.5° to 4.8° C. (4.5° to 8.5° F.). After icing in a two-stone (28-pound) box in the normal commercial manner, fish at the center cools very slowly and even after 10 hours may still not have cooled to below 1.7° C. (35° F.). (Fish Trades Gazette, August 17, 1957.)

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"FLYING SAUCER" FLOAT: An improved trawl plane float known as the "Flying Saucer" (fig. 1) has been developed by a Grimsby, England, gear firm. It is claimed that the new float gives absolute stability at fast towing speeds and maximum upthrust combined with minimum drag, resulting in a performance which at 3 knots equalled the upthrust obtained from its forerunner, namely, 38 pounds, with lowered drag reduction of only 11 pounds. Furthermore, when towed at 6 knots, the upthrust increased to 45 pounds and the drag reduction came down to 10 pounds with absolute stability. The new float's attachment lug is extended in such a manner as to form a stabilizer. The improved trawl

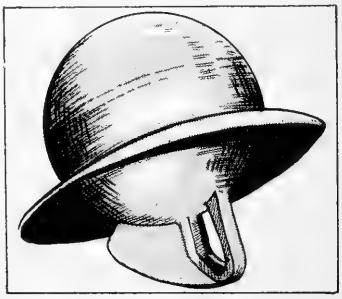

FIG. 1 - "FLYING SAUCER" FLOAT. NOTE THE EXTENSION OF THE ATTACHMENT LUG WHICH FORMS A STABILIZER.

plane, developed after some research by this Grimsby firm, will shortly be available.

Such factors as handling, freedom from fouling, water pressure, and manufacturing simplicity have all been taken into consideration in developing this new float with a high lift-drag ratio. The firm claims that the performance of the new float is unaffected by such things as direction of tow or tide. It is of a size which enables it to give a fully-distributed lift to the headline thus enabling the headline to retain its normal arc, and insuring unrestricted flow so essential to the meshes of the net.

FIG. 2 - ORIGINAL TRAWL PLANE FLOAT.

FIG. 3 - HYDRODYNAMIC TESTS OF ORIGINAL TRAWL PLANE FLOAT REVEALED THAT THE DRAG FACTOR WAS EXCESSIVE AND OVERCAME UPTHRUST AT SPEEDS OF TOW ABOVE 3 KNOTS. SKETCH SHOWS VORTEX CREATED BY DRAG IN THE ORIGINAL MODEL OF THE WEIGHTED PLANE BEING TOWED IN A SWIMMING POOL.

Further experiments in design embodying the best features of the various floats tested are being continued and developed by the Grimsby firm, and it is hoped that the "Flying Saucer" is merely a forerunner of more efficient floats to follow. (The Fishing News, August 30, 1957.)

The purpose of the trawl float is to support the headline of the trawl in these three situations: (1) when shooting: to assist the gear in paying away without fouling; (2) when towing: to keep open the mouth of the trawl in its proper arc insuring unrestricted flow of the net; (3) when hauling: to assist in getting the gear inboard.

Additional lift is always considered desirable, but only if obtained without excessive drag and such lift can be dispersed throughout the entire length of the headline to insure that the proper arc of the mouth of the trawl is maintained to prevent the flow of the net from being restricted.

Distortion of the headline restricts the opening of the mouth of the trawl and reduces its catching power accordingly, because the actual volume of ocean covered by the mouth of the trawl is correspondingly less.

The best results can therefore be expected from a number of regularly-spaced floats fitted with a hydrodynamically-designed planing surface, to give additional upthrust while being towed, and yet retaining sufficient static buoyancy to be of use when shooting and hauling operations are in progress.

Practical tests and research on a dozen or more different types of planing floats designed and supplied by the Grimsby firm were recently carried out in hydrodynamic tanks. The rig to which the float is attached in the test tanks during the test is suspended beneath an observation cabin.

The cabin has instruments for measuring buoyancy, upthrust, and drag, and accommodates 3 or 4 operators for recording the findings of each test and observing the actual behavior of the submerged float during each run at whatever speed of tow.

The behavior of submerged gear has previously been observed by frogmen but only at very slow speeds, which proved in the light of the above tests to be somewhat misleading, particularly in the case of the original trawl plane float (fig. 2).

Tests with the original trawl plane float (surrounded by the circular foil to provide a planing surface to give extra lift) showed that when towed at 3 knots, an additional upthrust of 38 pounds was obtained but this was accompanied by a drag reduction of 30 pounds. When the speed of tow was increased beyond $3\frac{1}{2}$ knots, the drag increased causing the trawl plane to stall. This resulted in undesirable oscillatory behavior, making geometrical correction to the design necessary before further tests could be made.

Only when thorough hydrodynamic tests were recently carried out was it established that the drag factor of the original trawl plane was excessive and, in fact, overcame upthrust at speeds of tow above $3\frac{1}{2}$ knots accounting for the vortex illustrated in figure 3. This was previously mistaken for lift but, in fact, is evidence of excessive drag.

A variety of modifications were made, and each was submitted to further tests until absolute stability at fast towing speeds, maximum upthrust, combined with minimum drag, was obtained, resulting in a performance which at 3 knots equalled the upthrust obtained from the original trawl plane namely, 38 pounds, with lowered drag reduction of only 11 pounds. This led to the development of the "Flying Saucer" float.

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400 NEW FISHING VESSELS IN FOUR YEARS: The British White Fish Authority (WFA) recently reported the progress made in rejuvenating Britain's fleet of near- and middle-water vessels and inshore fishing craft (excludes vessels classified as "distant-water craft") through the operation of the Grants and Loans Scheme introduced in 1953.

At the inception of the scheme, the Government aim was to build some 500 large craft in 10 years through the allocation of some £20 million (US$56 million) to be administered by the WFA.

Towards that objective 81 near- and middle-water trawlers have been completed, and 40 more are in the process of being built. Construction of 149 has been approved. Of inshore craft, 309 have been completed with 43 under construction. The grant is confined to vessels below 139 feet.

Building of distant-water trawlers is not included. (The Fishing News, August 30, 1957.

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NEW FILM ON TRAWL FISHERY: "Trawler Boy" is a new half-hour British fishery film. It is a color documentary made for two British private firms and the British White Fish Authority. It was chosen for showing at the Edinburgh Film Festival.

The film, already shown on independent television and in a number of theaters at fishing ports, tells of a two weeks' voyage by the Fleetwood Diesel trawler Boston Neptune as seen through the eyes of a 16-year-old learner deckhand.

"Trawler Boy" was made in Eastman color and in 16 mm. and 35 mm. It is being distributed by the two British firms and the White Fish Authority. (The Fishing News, August 23.)

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SCOTTISH PLANT DEHYDRATES FISH FILLETS: A Scottish plant processes raw fish fillets by evaporating their water content under vacuum at a low temperature. The processing unit is capable of drying 675 pounds of white fish to a moisture content of 5 percent in about 6 hours. Reconstitution is done simply by immersing the fillets in fresh cold water, when they take on the consistency of firm fresh fillets ready to be cooked in the same way as sea-fresh fish. (August 1957 Fisheries Newsletter of the Australian Commonwealth Director of Fisheries.)

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SUPPORT OF THREE-MILE LIMIT AT GENEVA CONFERENCE INDICATED: Great Britain's policies in regard to territorial waters, fishery limits, and fisheries conservation will be defined more precisely early in 1958 at the World Conference on the Law of the Sea, which is to be held at Geneva.

With the Faroese demand for a revision of the last agreement still being considered by the Foreign Office, there is some speculation as to what line the United Kingdom will now take when its representatives will be making statements of policy at the Geneva conference.

It is believed that Britain will continue to support the old three-mile limit for territorial waters as a general policy without, however, contradicting any particular agreements with individual countries made in recent years.

Any solutions reached by the conference would be embodied in "rules of the sea" for the future. The conference's conclusions may well affect existing arrangements.

Although Britain has in recent years signed agreements which give other countries protected waters beyond the three-mile limit, it is considered that these pacts will not cause any embarrassment at the conference.

At the time the agreements with Russia and Iceland were signed, the British reserved her legal rights on the three-mile limit.

Britain is likely to hold informal discussions with the Danes on their request for new negotiations on limits around the Faroes.

The Faroese would like four miles of protected waters instead of three. They also want an agreement on landings of Faroese fish in Britain, but that must be negotiated by the two fishing industries.

The Foreign Office is now studying a Danish memorandum on the subject, which has been discussed with the English and Scottish Fisheries Department (Fish Trades Gazette, August 24, 1957).

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TEN PERCENT OF BRITAIN'S FISH CATCH FROZEN: About 10 percent of Britain's fish catch is now frozen. There was virtually no freezing before 1938. In 1955 more than 68,000 metric tons of fish were frozen, resulting in a pack of 32,000 tons of quick-frozen processed fish.

Principal export markets for frozen fish are the United States and Australia, but recently a new trade outlet has been found in Eastern Europe.

Retail selling of frozen fish by grocers and food markets, and sales to hotels and shipping lines, are increasing. (August 1957 Fisheries Newsletter of the Australian Commonwealth Director of Fisheries.)

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SECOND DIESEL-ELECTRIC TRAWLER SAILS FOR ARCTIC: Britain's second commercial Diesel-electric trawler, the 205-foot 800-ton Cape Trafalgar, underwent speed and fishing tests early in September before setting course for the Arctic on her maiden voyage. The shipyard that built the vessel considers her a revolutionary type.

The sleek, high-powered extremely maneuverable Diesel-electric trawler, capable of slicing 24 hours or more off an Arctic voyage, is the British fishing industry's answer to the increasing demand for high-quality fresh fish.

The Cape Trafalgar cost over £250,000 (US$700,000) and was built without a government grant or loan. The first supertrawler, the Portia, has been fishing from Hull since October 1956. The keel of a third will be laid later this year.

Like two of the owners' other ships, the Trafalgar has a bulbous bow, which gives increased buoyancy forward and extra speed without needing extra power.

With an over-all length of 205 feet and a moulded breadth of 33 feet 6 inches, she has a flush main deck, a balanced flair to the whaleback forecastle with high bulwarks, and is designed for starboard fishing only.

There is an extension of the after deckhouse on the port side almost to amidships. This offers better scope for internal access, and extends crew accommodation. Many of the crew will occupy air-conditioned steam-heated single and double cabins. For normal wet fish voyages, the entire crew will be housed above main-deck level.

The superstructure is designed to minimize icing in northern latitudes, at the same time providing good observation. The midship structure, although in three tiers, is compact and offers the smallest aspect to the weather.

Although Portia had three Diesel engines (two small and a big one), there are four of the same size in the Cape Trafalgar.

Her electric propulsion motor, capable of developing 1,500 shaft horsepower at a propeller speed of 175 revolutions a minute, is driven by four 330-kw. 330-volt main generators, coupled direct to the Diesel-marine engines.

The trawler can operate with combinations of one to four generators, a feature which almost entirely rules out the possibility of her being completely immobilized at sea--an important safety factor. The winch is operated from any one

of the main generators, and the windlass is also electrically driven.

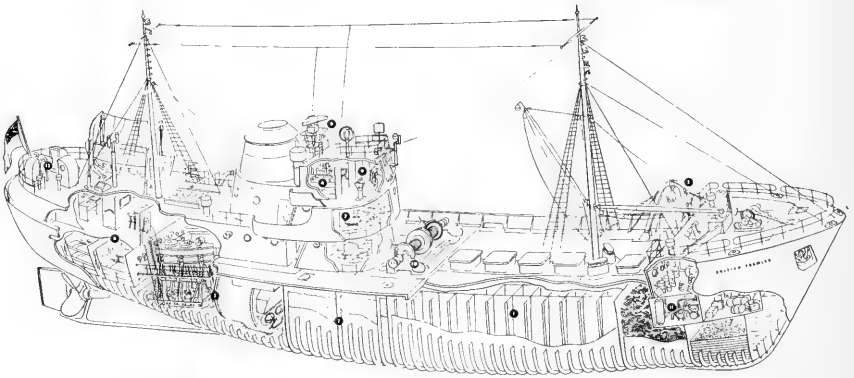
There is complete control of the ship from the bridge--an intriguing place with a wealth of apparatus. If the skipper wants to know the temperature in the fish hold, for instance, he has no need to leave the bridge. A special device tells him the answer.

Yet amid the welter of equipment one finds a smaller version of a traditional wheel, for the steering is power-assisted.

The fish room has a capacity of 17,200 cubic feet. Diesel oil tanks amidships hold 230 tons--enough fuel to give her a cruising radius of 40 days. The galley, too, is oil-fired. (The Fishing News, September 6, 1957.)

Let's go Fishing...

IT ONLY COSTS £220,000 A SHIP, AND £6,700 A VOYAGE



Building and fitting out a Distant Water trawler today costs at least six times more than it did before the war. In 1939 the price of a Distant Water ship was £30,000. This year, a brand new vessel like the one above – costs £200,000, and with full gear and equipment the cost is around £220,000. On top of that, crew wages, fuel oil, trawling gear and operating expenses come to around £6,700 for every trip. A ship makes an average of 14 trips a year, so that she has to earn £93,800 before she even starts to show a profit.

Yet in spite of the spectacular leap in costs, dockside fish prices have risen *much less than those of any other basic food* – only six per cent since 1951.

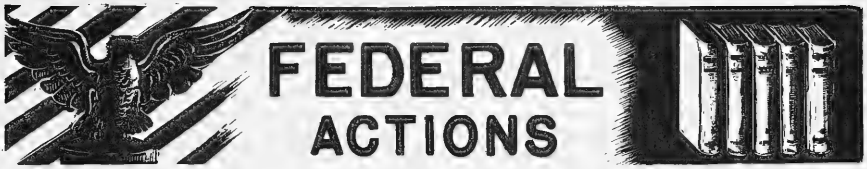
Trawlers today cost more to build because they are larger. They are larger in capacity, larger in length and breadth. The one shown above is 200 feet overall. They are powered by larger engines which give them greater range. Their crews now have accommodation equal to that on the world's biggest ships. The modern British trawler is the most efficient fishing machine, and the best sea ship ever designed–but she does cost money–at least £220,000.

All the money for building, replacing and equipping this efficient Distant Water Fleet comes from the industry itself–no Government subsidy. It's a gigantic British investment, and one that has never let the country down. This fleet is founded on the hard work, enterprise and experience of the trawler companies, skippers, and crews. They take the risks and they bring home the fish–and get the smallest profit-margin of all home produced first-class food. Neither ships nor catch is subsidised. They're on their own and proud of it. Think of these facts the next time you buy a nice fresh cod fillet.

SOME IMPORTANT FEATURES OF A MODERN BRITISH TRAWLER

1. FISH HOLD: approximate capacity–16,000 cubic feet. The insulated hold is chilled by a refrigerating plant. Fish hold is divided into compartments forming shelves on which the fish is laid out over *layers* of ice.
2. OIL FUEL BUNKERS: these hold 300 tons of fuel oil. This is sufficient for a voyage of one month with an average range of 280-290 miles a day. Most trips last about 21 days.
3. BOILER AND ENGINE ROOM: triple expansion super-heated steam engine of about 1,350 h.p., auxiliary engines for dynamos, pumps, etc. The furnaces are oil-fired.
4. W/T ROOM: radio and radar equipment is as good as that of the largest liners. Includes radar radiolocator, radiotelephone with Morse transmitter, two radio receivers, two direction finders, and two echo-sounders.
5. "GALLOWS": for the trawl lines which pass over the ship's side through this pulley and block.
6. CREW SPACE: includes double-berth cabins, mess-room, and galley. Each bunk is fitted with a reading lamp.
7. SKIPPER'S QUARTERS: the Captain's suite is panelled, and includes bedroom, day-room and bath-room. Below are the Mate's and Boatswain's cabins with the officer's mess-room adjoining.
8. RADAR SCANNER: the revolving scanner is connected to a screen in the W/T room.
9. WHEELHOUSE AND CHART ROOM: the wheelhouse is the nerve-centre of the ship. Fish is found by echo-sounders and the skipper directs operations by "Loud Hailer" and engine-room telegraph.
10. STEAM TRAWL WINCH: the powerful winch, carrying 750 fathoms of 1" wire on each drum, can haul up the heavy trawl from 2,000 feet below the surface.
11. FISHROOM COOLING PLANT: this latest type of refrigeration machinery maintains the correct temperature in the fish hold to keep the fish in perfect condition. Next door is the net store where the trawl is stowed when not fishing.
12. COD LIVER OIL PLANT: Cod Liver Oil is extracted soon after the fish are caught. The livers are cooked in jets of steam which separates the oils. The oil is then stored in tanks from which it is pumped out immediately the vessel docks.

(THE BRITISH TRAWLERS' FEDERATION)



Federal Trade Commission

COMPLAINTS ISSUED AGAINST FOUR SALMON PACKERS ON ALLEGED ILLEGAL BROKERAGE PAYMENTS:

Attacking selling practices in the canned salmon industry, the Federal Trade Commission on October 21, 1957, issued four complaints (6904, 6905, 6906, 6907, Canned Salmon) against four Seattle, Wash., packers alleging illegal brokerage payments were made to some customers.

The complaints charge the packers with granting large grocery chains discounts or allowances in lieu of brokerage in violation of Sec. 2(c) of the Clayton Act, as amended by the Robinson-Patman Act.

The complaints allege, among other things, that on direct sales which do not involve brokers, these packers reduce the market price to these chains by 5 percent--the amount of the normal brokerage fee.

In other transactions where sales are made through brokers, the complaints say the packers give these customers lower than market prices. As an example of this, the complaints cite the practice of giving a 2.5-percent reduction when only one broker is used, either a primary or field broker, and taking the price differential out of the broker's commission.

According to the complaints, the packers generally sell their canned salmon through both primary and field brokers. Primary brokers are the selling agents for the Seattle area while field brokers are those employed by the primaries to handle transactions in other market areas. A primary broker is usually paid 5-percent commission, except where a field broker is employed. In the latter instance, the complaints say, each receives a 2.5-percent split.

The parties are granted 30 days in which to file answers to the complaints. Hearings before a Federal Trade Commission hearing examiner were scheduled in Seattle in January 1958.

U. S. Tariff Commission

TUNA INVESTIGATION HEARING:

The U. S. Tariff Commission ordered a public hearing in connection with the supplemental investigation instituted August 26, 1957, under section 332 of the Tariff Act of 1930, in accordance with a resolution of the Committee on Finance, United States Senate, relating to tuna fish. The hearing started on December 11, 1957. The announcement regarding institution of the supplemental investigation appeared in the Federal Register (22 F. R. 7008). The Commission is studying the effects of tuna imports on the domestic tuna industry.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, OCTOBER 1957, P. 41.

Department of Health, Education, and Welfare

FOOD AND DRUG ADMINISTRATION

LABEL DECLARATION OF INGREDIENTS FOR CANNED CLAMS, FISH ROE, AND SHRIMP WILL BE REQUIRED IN ONE YEAR:

Effective in one year, lists of ingredients on the labels of certain nonstandardized food products will be required, the Food and Drug Administration announced in a statement of policy published in the September 17, 1957, Federal Register.

The action applies to food products which had previously been exempted from the labeling requirement. Among the products affected by the new statement of policy are canned clams, canned fish roe, and canned shrimp (dry and wet pack).

The new policy will be effective after one year in order that existing stocks of labels may be used up.

Eighty-Fifth Congress (First Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions, hearings, and other chamber actions by the House and Senate, as well as signature into law or other final disposition are covered.

The following reports were overlooked in previous issues of Commercial Fisheries Review and are being reported to complete the history of action on those bills that directly or indirectly affect the fisheries.

ALASKA STATEHOOD: Senate Report No. 1163, Providing for the Admission of the State of Alaska into the Union, to accompany S. 49, 101 pp., printed August 29, 1957, Committee on Interior and Insular Affairs, 85th Congress, 1st Session. This report gives the majority views which recommend the passage of the bill. The minority views are presented in Senate Report No. 1197 (see Commercial Fisheries Review, October 1957, p. 42). The report explains the purpose of the bill; the major provisions of the bill and how they apply to the facts in Alaska, such as property grants, financial provisions, and the judicial system. Under the heading "financial provisions," the new state would be granted 70 percent of the net proceeds from the sales of fur-seal and sea-otter skins. On the basis of past revenues to the United States, the new state would receive about $1,100,000 yearly from this source. Other sections of the report give historical and general information, reasons for statehood, readiness for statehood, and arguments against statehood are refuted. Each of the sections are discussed in some detail and the Appendix includes a Constitution for the State of Alaska.

FISHING VESSEL RIGHTS ON THE HIGH SEAS: House Report No. 1177, Protecting the Rights of United States Vessels on the High Seas, to accompany H. R. 5526, 7 pp., printed August 15, 1957, Committee on Merchant Marine and Fisheries, 85th Congress, 1st Session. Gives a favorable report on the bill with amendments. States the purpose of the bill, which is to provide additional protection to American fishermen from the illegal acts of foreign governments. Also included are statements on the provisions of the bill by various Government Departments and changes in the existing law (Public Law 680, 83d Congress, 2nd Session, approved August 27, 1954, 68 Stat. 883). Also see Commercial Fisheries Review, October 1957, p. 42.

MEAT OF ALL KINDS OF WHALES EDIBLE

The meat of all species of whales is edible, although some claim that the meat of sperm and bottlenose whales is unpalatable. Both are used as food by the Japanese, however.

Whale meat resembles beef chemically but it has less fat and contains more amino acids. Fishiness and oiliness possibly due to staleness may be objectionable characteristics, otherwise the meat tastes like coarse beef, veal, pork, or venison.

-- Sea Secrets, The Marine Laboratory, University of Miami, Coral Gables, Fla.

CHART 1 - FISHERY LANDINGS for SELECTED STATES

In Millions of Pounds

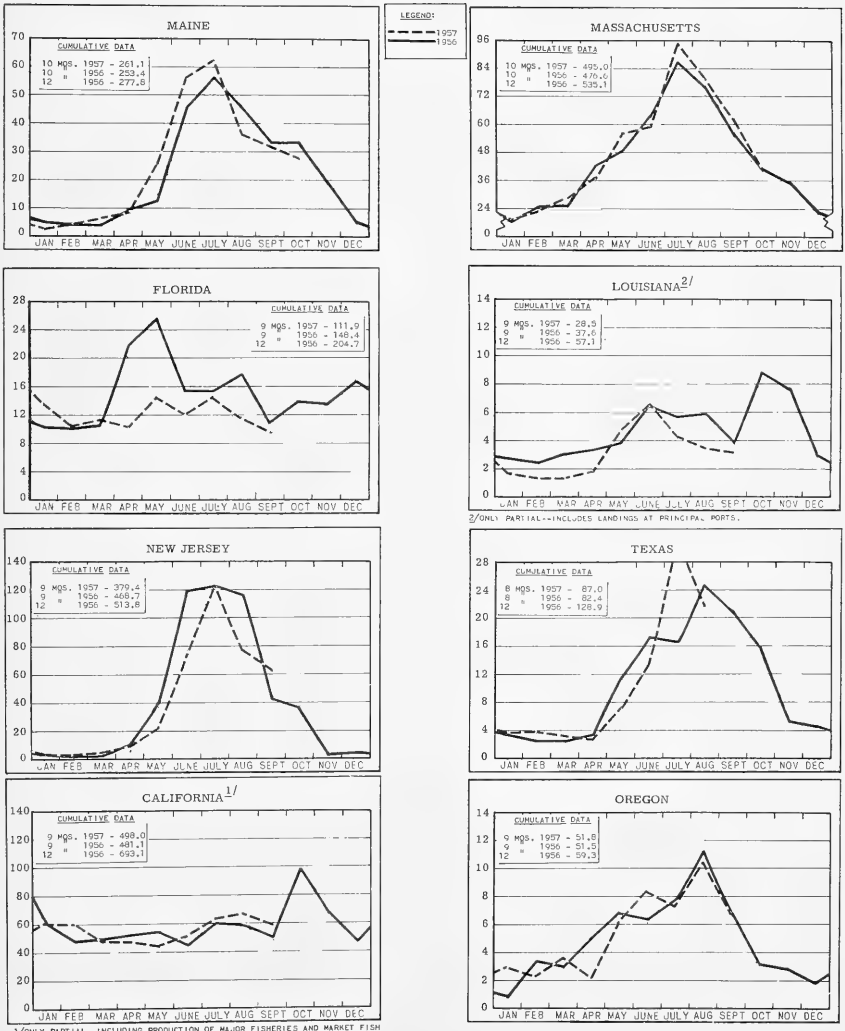
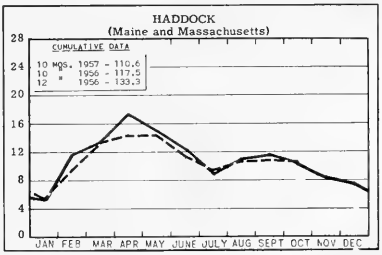
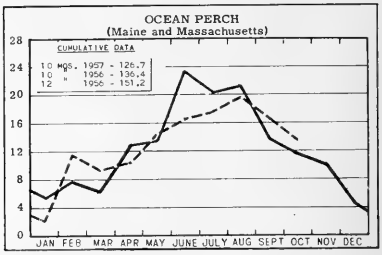


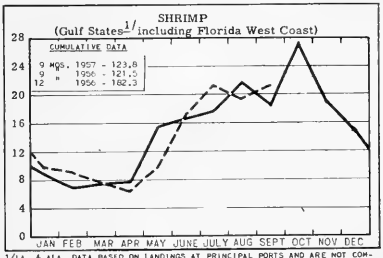
CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

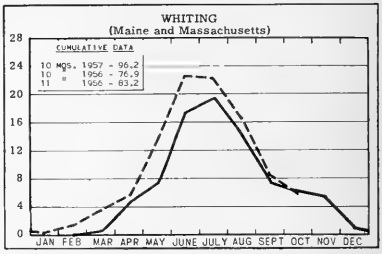




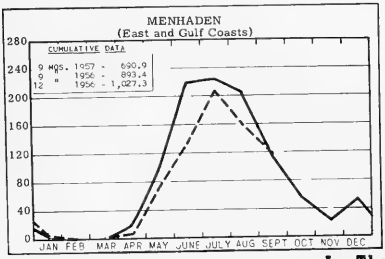
In Millions of Pounds

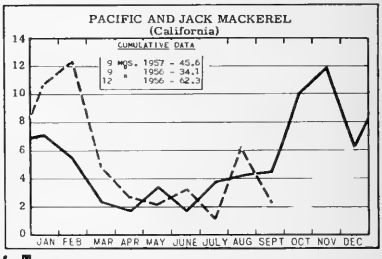


1/LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

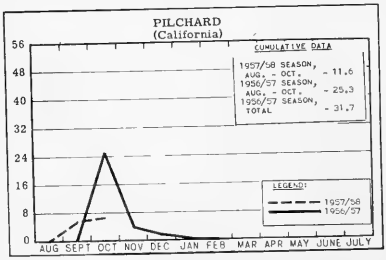


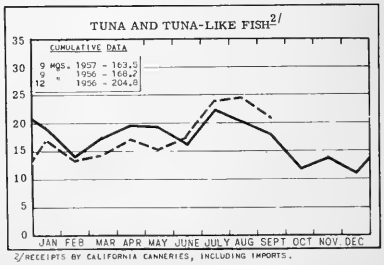
In Thousands of Tons





In Thousands of Tons

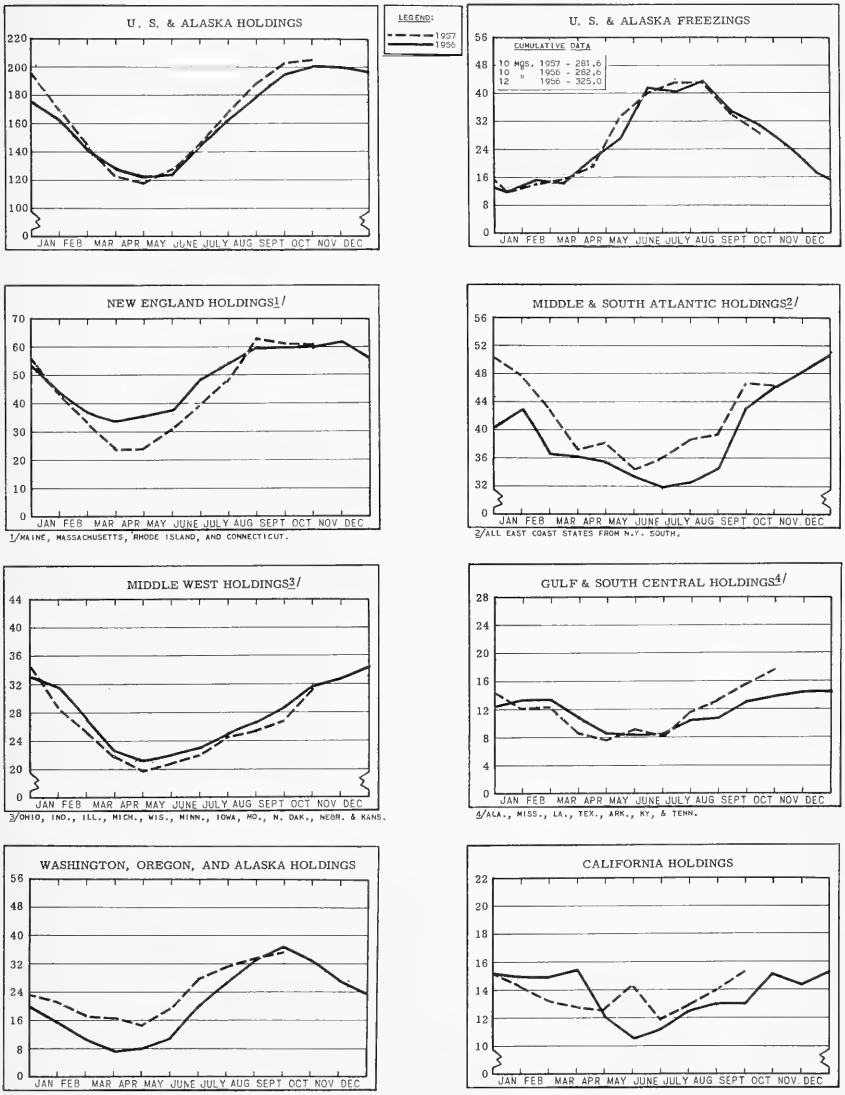




2/RECEIPTS BY CALIFORNIA CANNERIES, INCLUDING IMPORTS.

CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

In Millions of Pounds



1/MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT.

2/ALL EAST COAST STATES FROM N.Y. SOUTH.

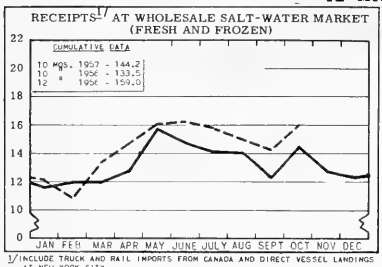
3/OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR. & KANS.

4/ALA., MISS., LA., TEX., ARK., KY., & TENN.

*Excludes salted, cured, and smoked products.

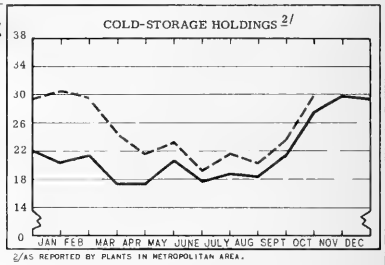
CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds

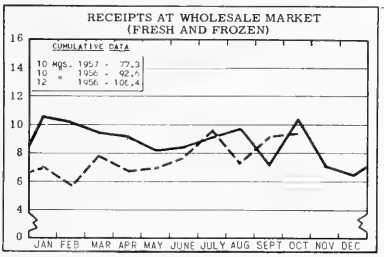


1/ INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.

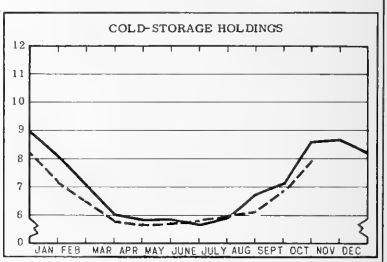
NEW YORK CITY



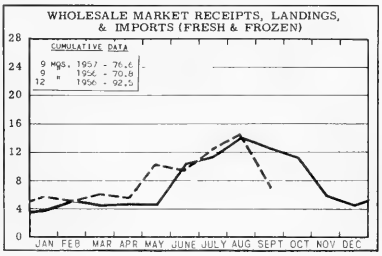
2/ AS REPORTED BY PLANTS IN METROPOLITAN AREA.



CHICAGO



SEATTLE



BOSTON

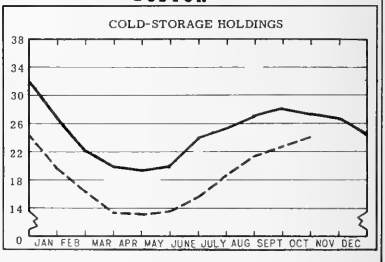
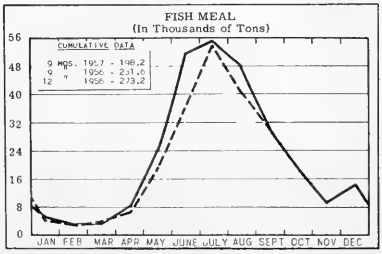


CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA



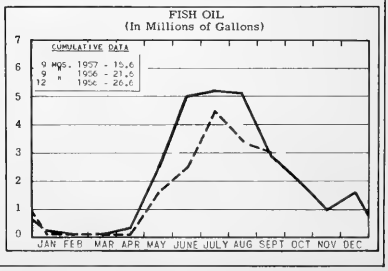
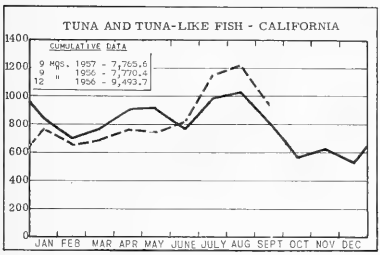
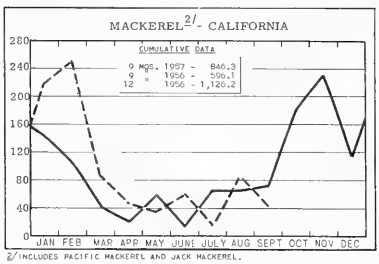


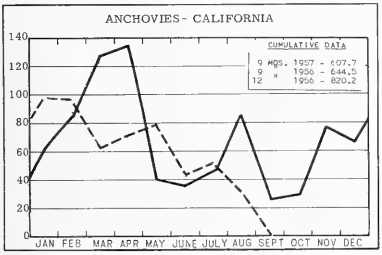
CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

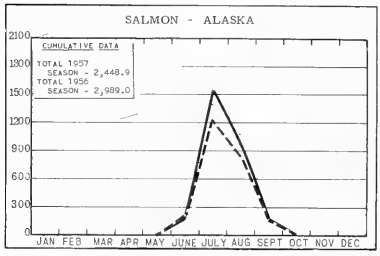
In Thousands of Standard Cases

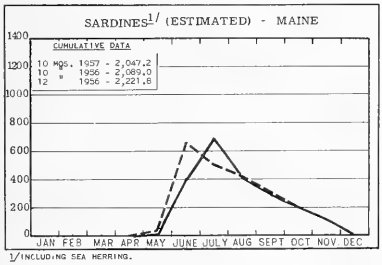




2/ INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.



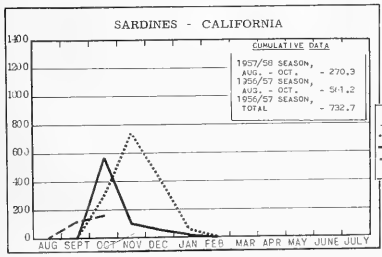


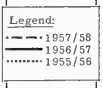


1/ INCLUDING SEA HERRING.

STANDARD CASES

Variety	No. Cans	Can Designation	Net Wgt.
SARDINES	100	¼ drawn	3¾ oz.
SHRIMP.....	48	--	5 oz.
TUNA	48	No. ½ tuna	6 & 7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
SALMON	48	1-pound tall	16 oz.
ANCHOVIES	48	½ lb.	8 oz.





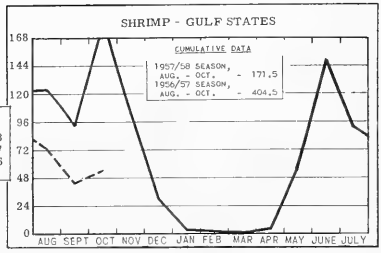
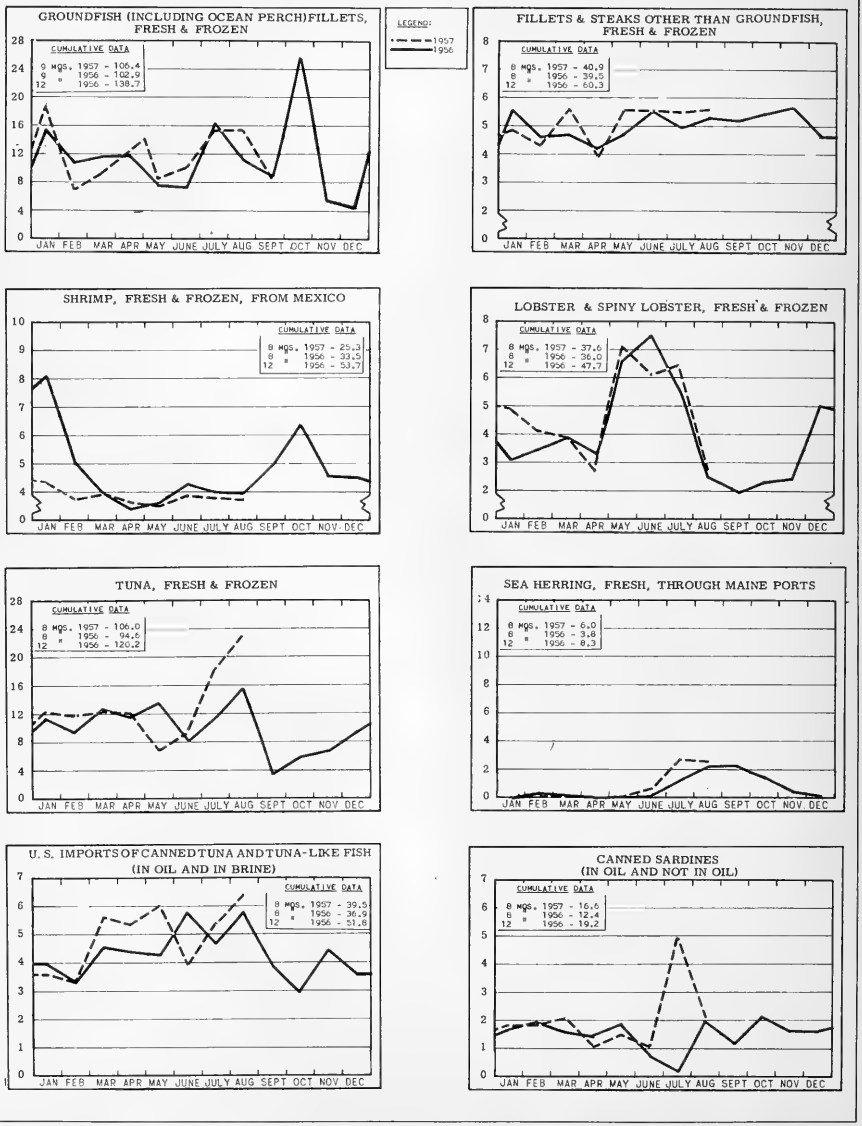


CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds



FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
FL - FISHERY LEAFLETS.
SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SSR. - FISH - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number Title

CFS-1595 - Imports and Exports of Fishery Products, 1952-56 Annual Summaries, 10 pp.
CFS-1599 - Massachusetts Landings, February 1957, 4 pp.
CFS-1604 - Fish Meal and Oil, June 1957 (revised), 2 pp.
CFS-1611 - Fisheries of the United States and Alaska, 1955 Annual Summary, 11 pp.
CFS-1612 - Shrimp Landings, April 1957, 5 pp.
CFS-1613 - Frozen Fish Report, July 1957, 8 pp.
CFS-1618 - New York Landings, June 1957, 4 pp.
CFS-1619 - Maine Landings, June 1957, 4 pp.
CFS-1620 - Massachusetts Landings, 1956 Annual Summary, 16 pp.
CFS-1621 - Rhode Island Landings, June 1957, 3 pp.
CFS-1622 - Ohio Landings, July 1957, 2 pp.
CFS-1623 - Mississippi Landings, June 1957, 2 pp.
CFS-1625 - Florida Landings, June 1957, 7 pp.
CFS-1626 - North Carolina Landings, July 1957, 3 pp.
CFS-1627 - Alabama Landings, July 1957, 2 pp.
CFS-1628 - South Carolina Landings, July 1957, 2 pp.
CFS-1631 - California Landings, May 1957, 4 pp.
CFS-1632 - Frozen Fish Report, August 1957, 8 pp.
CFS-1634 - Maine Landings, July 1957, 4 pp.
CFS-1635 - Shrimp Landings, May 1957, 6 pp.
CFS-1637 - Louisiana Landings, January-June 1957, 2 pp.

SL-12 - Wholesale Dealers in Fishery Products, Virginia, August 1957 (revised), 10 pp.

FL-336hh - Commercial Fisheries Outlook, October-December 1957, 48 pp., October 1957.

FL-444 - Some Publications on Game-Fish and Sport Fishing, 10 pp., July 1957. A listing of the more recent and better known publications on fishes, fishing, and fishing equipment.

SSR-Fish. No. 204 - Comparative Study of Populations of the Striped Bass, by Robert Minturn Lewis, 54 pp., June 1957.

SSR-Fish. No. 210 - Physical, Oceanographic, Biological, and Chemical Data--South Atlantic Coast of the United States, Theodore N. Gill Cruise 3, by William W. Anderson and Jack W. Gehringer, 208 pp., illus., June 1957.

SSR-Fish. No. 216 - Morphometric Study of the Striped Bass, Roccus saxatilis, by William A. Lund, Jr., 24 pp., July 1957.

SSR-Fish. No. 225 - Studies on Tilapia as Skipjack Bait, by Joseph E. King and Peter T. Wilson, 8 pp., illus., July 1957. Describes experiments in the Hawaiian Islands with tilapia as skipjack bait. Results indicate that tilapia, while inferior in many respects to the native bait (nehu), possesses many desirable qualities. Conclusions indicate that if small tilapia can be produced in large volume at a reasonable price, the great need in the Hawaiian skipjack fishery for additional bait supplies might be alleviated.

SSR-Fish. No. 229 - History of Red Lakes Fishery, 1917-38, with Observations on Population Status, by John Van Oosten and Hilary J. Deason, 63 pp., August 1957. A report, covering research done in 1938 and completed just before World War II, that is now being published--particularly in view of the current investigations on the Red Lakes by the University of Minnesota in cooperation with the U. S. Fish and Wildlife Service. It traces the development of the commercial fisheries of the Red Lakes, Minnesota, from its inception in 1917 through 1938. Gives the trends of production and catch per unit of effort for the principal species with notes on statistics of the minor fishes. Presents life history data for the walleye and yellow perch and a historical account of the artificial propagation of the walleye and whitefish from 1918 through 1938.

Sep. No. 490 - Bone Detection in Fish by X-Ray Examination: Part 2 - Fluoroscopic Examination of Frozen Fried Fish Sticks.

Sep. No. 491 - Meat Content of Pavlof Bay King Crabs.

Sep. No. 492 - Research in Service Laboratories (November 1957): Contains these articles--"Brine-Frozen Haddock Tests by Industry;" "New Vessel Fish-Icing Techniques Prove Value to New England Fisheries;" "Plans for Development of

Federal Specifications for Fishery Products;" "Scallop Meats Frozen in Glucose-Salt Solution Aboard Vessel;" and "Structure and Function of the Kidney in the Oyster."

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

Use of Electric Fish Diversion Weirs at Northwest Salmon-Cultural Stations, 35 pp., illus. (Bureau of Sport Fisheries and Wildlife, U. S. Fish and Wildlife Service, Portland, Oreg.) A review and evaluation of electrical weirs used by the Fish and Wildlife Service salmon hatcheries in the Northwest. All of the electrical fish screen work in the Northwest has been directed toward producing a device, nonlethal and noninjurious to valuable species, yet effective in diverting fish from entering potentially dangerous channels. The history of the devices briefly summarized in this report shows that, to date, no single barrier has been developed that is universally acceptable, and none of the devices are completely free from justified criticisms or suspicion of deficiencies. According to the report, further study and development are needed before such installations can be recommended for universal use.

Fish Protection at the Tracy Pumping Plant, Central Valley Project, California (Development of a Fish Salvage Facility), 114 pp., plates, maps, diagrams, tables, illus., processed. U. S. Department of the Interior, Bureau of Reclamation, Region 2, Sacramento, Calif., and Fish and Wildlife Service, Region 1, Portland, Oreg.

Boston Fishery Products Monthly Summary, August 1957, 15 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Landings and ex-vessel prices by species for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; and Boston frozen fishery products prices to primary wholesalers; for the month indicated.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, August 1957, 5 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; and wholesale prices of fish and shellfish on the New Orleans French Market; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, September 1957, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Ocean City, and Cambridge; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

(New York) Monthly Summary - April 1957 - Receipts of Fishery Products at the New York City Wholesale Salt-Water Market, 16 pp. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.) Receipts in the salt-water section of the Fulton Fish Market by species and by states and provinces for month indicated.

(Seattle) Monthly Summary - Fishery Products, August 1957 and September 1957 issues, 7 pp. each. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 South, Seattle 1, Wash.) Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria (Oregon) wholesale dealers; also Northwest Pacific halibut landings; for the months indicated.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Delicious Recipes for Fish and Shellfish, Circular 50, 10-panel folder, illus., printed, $5 per 100. A promotional leaflet for distribution through food stores containing 18 ways of preparing fish and shellfish and suggestions for garnishes. In addition, it contains a purchasing guide showing how fresh and frozen fish are marketed.

Larval Forms of the Fresh-Water Mullet (AGONOSTOMUS MONTICOLA) from the Open Ocean off the Bahamas and South Atlantic Coast of the United States, by William W. Anderson, Fishery Bulletin 120 (From Fishery Bulletin of the Fish and Wildlife Service, vol. 57), 13 pp., illus., printed, 15 cents, 1957.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ALGAE:

Marine Algae of the Northeastern Coast of North America, by William Randolph Taylor, illus., by Chin-Chih Jao, Scientific Ser. v. 13, 509 pp., illus., printed, $12.50. University of Michigan Press, Ann Arbor, Mich., 1957.

CANADA:

Fisheries Statistics of Canada, 1955 (New Brunswick), 59 pp., printed in French and English, 50 Canadian cents. Queen's Printer and Controller of Stationery, Ottawa, Canada, 1957. Consists of tables giving the production and value of the principal species of fish and shellfish in New Brunswick in 1952-55; quantity and value of landings by species and fisheries districts, 1954-55; quantity and value of manufactured fishery products by species and fisheries districts, 1954-55; capital equipment in the primary fisheries operations; and the number of persons engaged in the fisheries.

Fisheries Statistics of Canada (Nova Scotia), 1955, 93 pp., printed in French and English, 50 Canadian cents. Queen's Printer and Controller of Stationery, Ottawa, Canada, 1957. Consists of tables giving the quantity and value of fish and shellfish landed in Nova Scotia, 1952-55, by species and by fisheries districts; quantity and value

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of manufactured fishery products and byproducts for 1954-55; capital equipment in primary operations; and number of persons engaged in the primary operations.

Fisheries Statistics of Canada, 1955 (Ontario, Prairie Provinces and Northwest Territories), 67 pp., printed in French and English, 50 Canadian cents. Queen's Printer and Controller of Stationery, Ottawa, Canada, 1957. Consists of tables giving the quantity and value of the principal species of inland fish landed in Ontario in 1952-55; quantity and value of landings by species and fisheries districts, Ontario, 1954-55; capital equipment in the primary fisheries operations; and the number of persons engaged in the fisheries. Similar data are also given of the Prairie Provinces (Manitoba, Saskatchewan, and Alberta) and the Northwest Territories.

"'Open House' at St. Andrews," by Mark Ronayne, article, Trade News, vol. 10, no. 2, August 1957, pp. 3-8, illus., printed. Director of Information and Educational Service, Department of Fisheries, Ottawa, Canada. Describes the third annual two-day forum conducted by scientists from the Fisheries Research Board of Canada attached to the Biological Station at St. Andrews, New Brunswick. This meeting served as a practical means of acquainting fishing industry representatives with scientific progress and developments in marine and fresh-water fisheries research. Informal lectures given by the Station's scientists covered vessel and gear research; marketing factors; expansion of the Station; geology and trout; controls on lobster fishery; redfish; (ocean perch) oceanography; herring research; and the needs of the fishing industry. The author presents the highlights of the above-mentioned lectures in this article.

Summary Statistics of Canada's Fisheries, 1936-1955, 32 pp., printed. (Reprinted from Canadian Fisheries Annual, 1957, pp. 67-98.) Department of Fisheries, Ottawa, Canada. Statistics are presented in eight sections on landings and value of Canadian fisheries and related data: (1) summary statistics for 1949-1956; (2) East-Coast fisheries covering (a) Newfoundland and (b) Maritimes and Quebec; (3) fresh-water fisheries; (4) West-Coast fisheries; (5) fillet production; and (6, 7 & 8) exports and imports. Also included is a directory of fishery products by type, such as fresh and frozen fish (whole or dressed), fresh and frozen fish (filleted), smoked fish (dressed or filleted), cured fish, canned fish (not including shellfish), shellfish (in shell or meat--not canned), canned shellfish, fish oils and fish livers, fish meal, and other fishery products. Listed under each classification are the companies which process that particular product.

CEYLON:

Administration Report of the Director of Fisheries for 1956 (Part IV--Education, Science, and Art), by D. T. E. A. de Fonseka, 28 pp., printed. Government Publications Bureau, Colombo, Ceylon, July 1957. Progress reports for the year 1956 are presented by the Department of Fisheries' Administration and Socio Economic Division, Development Division, Commercial Section, and Research Division. Among the subjects covered are: enforcement of fisheries regulations; cooperative development of the fisheries; mechanization of fishing craft; fresh-water fishery development; and fishery byproducts. Statistical data are also included on the production of fresh and cured fish, and imports and exports of fishery products and byproducts.

COELACANTH:

The Search Beneath the Sea--The Story of the Coelacanth, by J. L. B. Smith, 260 pp., illus., printed. Henry Holt and Company, Inc., New York, N. Y., 1956. An exciting, personal account of the discovery of the first coelacanth--a "living fossil" fish believed to have been extinct 50 million years ago. The author describes his years of work and searching that led to subsequent discoveries of coelacanths.

DIRECTORIES:

Directory of Members--National Food Brokers Association (Corrected to August 1957), 204 pp., illus., printed. National Food Brokers Association, 1916 M Street, N. W., Washington 6, D. C. A directory, by states and neighboring nations, of the leading food broker firms in every market area. Numerals in the directory indicate the commodities presently handled by each firm listed--including canned and frozen fish and luxury food items such as caviar.

Directory of Frozen Food Packers, 1957, 24 pp., printed. National Association of Frozen Food Packers, 1415 K Street, N. W., Washington 5, D. C. A directory containing a listing of every packer-member of the National Association of Frozen Food Packers and the products packed by each. It serves as a ready reference to producers of frozen products in the nation, including seafood and seafood dishes.

ECHO-SOUNDING:

The Interpretation of Echo Traces, by D. H. Cushing, Fishery Investigations, Series II, Vol. XXI, No. 3, 16 pp., illus., printed. Her Majesty's Stationery Office, York House, Kinsway, London W. C. 2, England, 1957. Reports on the four types of fish traces--spot, cone, plume, and layer--recorded on the paper records of echo sounders used in different depths. The form of fish traces can give useful biological information on the sizes and formations of fish shoals; however, the author indicates that more accurate methods of identifying fish traces are needed in order to increase the usefulness of echo-sounding in commercial fisheries.

FISH OILS:

"South African Pilchard Oil. 6. The Isolation and Structure of a Docosahexaenoic Acid from South African Pilchard Oil," by J. M. Whitcutt, article, The Biochemical Journal, vol. 67, no. 1, 1957, pp. 60-64, illus., printed, 25s. (US$4.25) net per issue. Cambridge University Press, American Branch, 32 East 57th Street, New York 22, N. Y

FREEZING FISH AT SEA:

Report on an Experiment into the Freezing of Fish at Sea, 79 pp., illus. with photographic plates and

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diagrammatic charts, printed. White Fish Authority, Tilbury House, Petty France, London, S. W. 1, England. Reports on a practical experiment to test the commercial possibilities of freezing whole fish at sea on an existing trawler suitably converted for that purpose. Part I of this report describes the circumstances in which the freezing-fish-at-sea experiment was undertaken, the course of the experiment, and the conclusions reached. Part II consists of a series of papers on the technical aspects and the lessons learned from the experiment. Part III contains detailed statistics of the fish caught and frozen and photographs and diagrams of some of the equipment used. The results of the experiment indicate that (1) it is technically practicable to freeze fish at sea under all weather conditions; (2) the quality of the fish caught is improved through a reduction of the period of time during which unfrozen fish is kept on ice; and (3) the productivity of the trawler can be increased considerably. The financial results of the experiment are less conclusive, but it is thought that if the frozen fish were held in storage for times of short supply, the higher prices received would compensate for the higher costs of production and storage.

GENERAL:

How to Clean Fishy Surfaces, by R. Spencer, D. S. I. R. Food Investigation Misc. Paper No. 4/57, 4 pp., illus., printed. (Supplement to Fishing News and Fish Selling.) Humber Laboratory, Food Investigation Organization, Department of Scientific and Industrial Research, Aberdeen, Scotland.

Window in the Sea, by Ralph Nading Hill, 208 pp., illus., printed. Rinehart & Company, Inc., New York, N. Y., 1956. A vivid and interesting account of the many difficulties and rewarding success undergone by the men that created the Marine Studios Oceanarium in Florida. In the many incidents related by the author, the outstanding fish and mammals of the oceanarium evolve as personalities--both humorous and sad. Many photographs are included, giving the reader fascinating glimpses of the little-known world in the sea.

The Wonderful World of the Sea, by James Fisher, 68 pp., illus. in color, printed, $2.95. Garden City Books, New York, N. Y., 1957. A book of general interest dealing with the sea and its waters; life within the sea; the sea and its challenge to man; and man's challenge to the sea.

HERRING:

On the Herring of the Southern North Sea, by D. H. Cushing and A. C. Burd, Fishery Investigations, Series II, Vol. XX, No. 11, $1.53. Her Majesty's Stationery Office, 13a Castle Street, Edinburgh 2, Scotland, December 19, 1956. Available from Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N. Y.

JAPAN:

Bulletin of the Faculty of Fisheries, Hokkaido University, vol. 8, no. 1, pp. 1-86, illus., printed in Japanese with summaries in English. Faculty of Fisheries, Hokkaido University, Hakodate, Japan, May 1957. Contains among others the following scientific papers: "Studies on crystalline Whale Insulin. II. Amino Acid Composition," by Tsuneyuki Saito, Yoshio Ishihara, Yasuzo Ito, and Masahiko Fujino; "The Formation of Magnesium-Ammonium-Phosphate Crystals in Canned Sea Foods. III. The Crystallizing State of Chemically Synthesized Crystals at Various Temperatures," by Eiichi Tanikawa, Yoshio Nagasawa, and Takashi Sugiyama; "The Formation of Magnesium-Ammonium-Phosphate Crystals in Canned Sea Foods. IV. Formation of the Crystal of $MgNH_4P0_4 \cdot 6H_20$ and its Minimum Ion Concentration," by Eiichi Tanikawa, Yoshio Nagasawa, and Takashi Sugiyama; and "The Formation of Magnesium-Ammonium-Phosphate Crystals in Canned Sea Foods. V. The Growth of the Crystals of $MgNH_4P0_4 \cdot 6H_20$ in Glass Vessel," by Eiichi Tanikawa, Yoshio Nagasawa, and Takashi Sugiyama.

Bulletin of Tokai Regional Fisheries Laboratory, no. 15, January 1957, 238 pp. text, 8 pp. photographs, illus., printed in Japanese and English. Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-Ku, Tokyo, Japan. Contains, among others, the following articles: "On the Catch of O-Age Sardine in Matsu Bay," by S. Hayashi; "Growth of the Japanese Anchovy--III. Vertebral Counts of the Post Larvae," by S. Hayashi and H. Suzuki; "Behaviors of Fishes Entering Trap Nets," by H. Miyamoto; "Study on Bait for Tuna Long Line--I. An Artificial Bait of Latex Sponge Shaped Like a Squid," by T. Koyama; and "Studies on the Properties of Shark Skin as the Raw Material for Manufacturing Leather," by T. Takahashi, A. Ishino, T. Tanaka, M. Takei, and W. Yokoyama.

The Tohoku Journal of Agricultural Research, vol. VII, no. 3, January 1957, 105 pp., illus., printed. Faculty of Agriculture, Tohoku University, Kita-6-Bancho, Sendai, Japan. Contains, among others, the following articles: "A Rapid Method for the Determination of Moisture Content in Fish Meat--II. Relation Between Error of Estimation and Fat Content," by Y. Tsuchiya and Y. Sato; "Studies on the Conjugated Fatty Acids--Part II. The Thermal Polymerization of the Conjugated Fish Oil Contained by the Nickel-on-Carbon Catalyst Isomerization," by Y. Tsuchiya and M. Kayama; and "Comparative Biochemical Studies on Aquatic Animals--II. Phosphorus Turnover of the Freshwater Fish and Shellfish," by M. Asano and M. Ito.

LOBSTER:

Processing Lobster and Lobster Meat for Freezing and Storage, by John S. Getchell and Matthew E. Highlands, Bulletin 558, 15 pp., printed. Agricultural Experiment Station, Orono, Maine, 1957.

MANAGEMENT:

Managing Our Fish and Wildlife Resources (Institute), Mar. 21-22, 1957, Center for Continuation Study, 90 pp., printed. University of Minnesota, Minneapolis, Minn., 1957.

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MARINE ENGINEERING:

Marine Electrical Practice, by G. O. Watson, 334 pp., illus., printed, $12. Philosophical Library, Inc., 15 E. 40th St., New York 16, N.Y., 1957. This is a practical guide to seagoing engineers or electricians, electrical draughtsmen, and engineers employed on the installation, maintenance, or operation of marine electrical equipment. The purpose of this book is to fill the gap which confronts the marine engineer when he has mastered fundamental formulae and elementary principles and begins to apply himself to practical problems. Among the subjects covered are generators, switchgear, motors and motor control, batteries, lighting, cables and distribution, and electrically-driven auxiliaries such as steering gear. Included is much practical information on such subjects as insulation testing. Comprehensive chapters are to be found on a. c. generators and switchgear. Typical connection diagrams and the behavior of machines and apparatus are presented. Although in general the descriptions are based on British practice, the underlying principles apply equally to practice in other countries even if the physical appearance of the apparatus may differ. Among others, the book is intended to help many seagoing engineers which are charged with the care of electrical installations without any previous knowledge. Besides the author, there are chapters by R. A. Harvey, R. V. Mills, and H. R. Ruff. Some of the other chapter headings are insulation and temperature ratings of machines, rotary amplifiers, methods of installing cables, control gear, graphical symbols, etc. The book with 182 illustrations is well illustrated.

MEETINGS AND PROCEEDINGS:

Proceedings of the Gulf and Caribbean Fisheries Institute, Ninth Annual Session, Nassau, Bahamas, November 1956, 197 pp., illus., printed, $1. The Gulf and Caribbean Fisheries Institute, The Marine Laboratory, University of Miami, Coral Gables, Fla., September 1957. Contains all of the papers presented at the ninth session (Nassau, Bahamas, 1956) of the Institute. The opening address on the Federal Government's role in the development of new fishery resources was delivered by Arnie J. Suomela. At the Shrimp Session the following papers were presented: "Aims and Progress in Gulf Investigations' Shrimp Research," by Thomas J. Costello; "Intermittent Shrimp Sampling in Apalachicola Bay with Biological Notes and Regulatory Applications," by Robert M. Ingle; "Mesh Size Regulations as a Possible Method of Managing the Tortugas Shrimp Fishery," by James Regan, C. P. Idyll, and Edwin S. Iversen; "Biochemical and Bacteriological Methods for Determining Shrimp Quality," by C. R. Fellers, M. Gagnon, and R. Khatchikian; "The Effects of Chlortetracycline on Shrimp Spoilage at Various Temperatures," by Lionel Farber and Peter A. Lerke; "The Effects of the Antibiotic Chlortetracycline on Shrimp Freshness," abstract by C. Isaac Cambor, James E. Alexander, and Mary H. Vance; and "International Law of Fisheries," by S. A. Bayitch. Papers for the Exploratory Fishing and Technology Session discussed "A New Federal Fishing Laboratory on the Gulf," by Charles Butler; "Progress in Technological Studies on Menhaden Products Under the Saltonstall-Kennedy Program," by Theodore M. Miller; "Oxidative Deterioration in Fish and Fishery Products," by Harold S. Olcott; and "Royal Red Shrimp--A New South Atlantic Resource," by Harvey R. Bullis, Jr. Subjects of the papers presented at the Economic Session included: "Some Findings on Insurance Experience of Commercial Fishing Vessels in the Gulf of Mexico," by Warner C. Danforth and Chris A. Theodore; "Ways and Means of Stabilizing the Shrimp Market," by Richard A. Kahn; "A Summary of Studies on the Marketing of Florida Fish," abstract by Barton A. Westerlund, James Murdock, Jack T. Brawner, C. P. Idyll, and Albert Rosen; "Fish Consumption--Where is it Headed?" by A. W. Anderson; and "The New Place of Commercial Fisheries in the United States Government," by John L. Farley. The Biological Session presented papers on: "The Status of Scientific Knowledge About the Snapper (Lutjanus aya Bloch) and the Economic Importance of this Fishery," abstract by Jerome E. Stein; "Biological Investigation of Atlantic Coast Menhaden," by Fred C. June; "Studies on the Life History of the Spotted Sea Trout, Cynoscion nebulosus (C. & V.)," abstract by Durbin Tabb; "Field and Laboratory Observations on the Growth of Some Bermuda Reef Fisheries," by John E. Bardoch and David W. Menzel; "A Survey of Spearfishing in the Florida Keys," by James Murdock; and "Progress of Recovery of the Commercial Sponge Beds of Florida," by John F. Storr. At the Caribbean and General Session the following papers were presented: "The Present Situation in the Fishing Industry of Cuba," by Jose A. Suarez Caabro; "The National Institute of Fisheries of Cuba"; "Marine Fisheries of the Yucatan Peninsula, Mexico," by Jorge Carranza; "Developing a Caribbean Fishery," by D. W. Wiles; "The Survey of Living Aquatic Resources," by H. Rosa, Jr.; "Activities of the Corps of Engineers Related to Florida Coastal Fisheries," by Oscar Rawls; and "The Activities of the U. S. Fish and Wildlife Service, Water-Use Projects and the Marine Fishery Resources of Florida," by Arthur R. Marshall.

MISSISSIPPI RIVER:

"Commercial Fishing on the Mississippi," by Leroy W. Small, article, Wisconsin Conservation Bulletin, vol. 22, no. 9, September 1957. pp. 29-31, illus., printed. Wisconsin Conservation Department, State Office Bldg., Madison 1, Wis. The commercial fishermen on the upper Mississippi River are permitted to catch catfish, shovelnose sturgeon, sheepshead, mooneye, and other rough fish with a variety of gear. This article describes the gear and methods used, giving special emphasis to seine and gill net fishing--which are the most effective.

MOTHER-OF-PEARL:

"Mother-of-Pearl Industry in French Oceania," by Michel Gug, article, The SPC Quarterly Bulletin, vol. 7, no. 3, July 1957, pp. 19-21, illus., printed, single copy 30 U. S. cents. South Pacific Commission, Box 5254, G.P.O. Sydney, Australia.

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Discusses briefly the life history of the pearl oyster, Pinctada margaritifera, from which mother-of-pearl is obtained. Also tells where these pearl oysters are found, how they are taken, the importance of the mother-of-pearl industry in French Oceania, and the measures taken for conservation of this resource.

NEW YORK:
"Around Long Island Underwater--A Guided Tour of New York's Marine Treasure House," by Erwin J. Ernst, article, The New York State Conservationist, vol. 12, no. 1, August-September 1957, pp. 23-26, 38, 39, illus., printed, single copy 50 cents. New York State Conservation Department, Arcade Bldg., Albany, N. Y. Describes the marine life in the shallow oceanic shorelines of Long Island, N. Y., as observed by "free" divers equipped with self-contained underwater breathing apparatus. A two-page colored plate showing the various species mentioned in the article adds vividness to the realistic text.

OCEANOGRAPHY:
Primary Production, Chlorophyll, and Zooplankton Volumes in the Tropical Eastern Pacific Ocean, by Robert W. Holmes, Milner B. Schaefer, and Bell M. Shimada, Bulletin vol. II, no. 4, pp. 129-169, illus., printed in English and Spanish. Inter-American Tropical Tuna Commission, La Jolla, Calif., 1957.

OYSTERS:
Oyster Production in the Rivers Crouch and Roach, Essex, from 1950 to 1954, by G. Duncan Waugh, Fishery Investigations, Series II, Vol. XXI, No. 1, 47 pp., illus., printed. Her Majesty's Stationery Office, York House, Kinsway, London W. C. 2, England, 1957.

PORTUGAL:
Gremio dos Armadores da Pesca da Sardinha, Relatorio e Contas do Exercicio de 1956 e Orcamento para 1957 (Sardine Vessel Owners' Guild, Statement of Operations for 1956 and Budget for 1957), 12 pp. text, 7 pp. charts, printed in Portuguese. Comissao Revisora de Contas, Lisbon, Portugal.

REFRIGERATION:
Journal of the Fisheries Research Board of Canada, vol. 14, no. 4, 181 pp., illus., printed. Fisheries Research Board of Canada, Ottawa, Canada, July 1957. Contains, among others, the following articles: "The Action of Pseudomonas on Fish Muscle: I. Organisms Responsible for Odours Produced during Incipient Spoilage of Chilled Fish Muscle," by C. H. Castell and Maxine F. Greenough; "Influence of Intermittent Short Storage Periods at 15° F., as Encountered during Refrigerator Car Transportation, on the Quality of Frozen Cod Stored at 0° F.," by W. J. Dyer, Doris I. Fraser, D. G. Ellis, and W. A. MacCallum; and "Yellow Discoloration and Deterioration in Frozen Lobster Meat," by E. G. Bligh, W. J. Dyer, and D. C. Horne.

SALMON:
Collection and Interpretation of Sockeye Salmon Scales, by R. I. Clutter and L. E. Whitsel, Bulletin IX, 163 pp., illus., printed. International Pacific Salmon Fisheries Commission, New Westminster, B. C., Canada, 1956.

Sockeye and Pink Salmon Fisheries, TIAS 3867, 6 pp., printed, 5 cents. Public Services Division, Department of State, Washington 25, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) The protocol between the United States and Canada amending the convention of May 26, 1930.

SHAD:
Shad Catches and Water Temperatures in Virginia, by William H. Massmann and Anthony L. Pacheco, 2 pp., illus., printed. (Reprinted from the Journal of Wildlife Management, vol. 21, no. 3, July 1957, pp. 351-352.) Virginia Fisheries Laboratory, Gloucester Point, Va.

SHRIMP:
"Shrimp Potpourri," by Percy Viosca, Jr., article, Louisiana Conservationist, vol. 9, no. 7, July-August 1957, pp. 10-13, 20-21, illus., printed. Louisiana Wild Life and Fisheries Commission, 126 Civil Courts Bldg., New Orleans, La. Presents a brief history of Louisiana's shrimp industry--its leading seafood industry--and summarizes the technological developments and advances in gear. Discusses separately each of the commercially-important species of (1) the free-spawning type of shrimp: the white shrimp (Penaeus setiferus), the brown shrimp (Penaeus aztecus), the pink shrimp (Penaeus duorarum), and the seabob (Xiphopeneus kroyeri); and (2) the egg-bearing shrimp: the river shrimp (Macrobrachium ohione) and the delta shrimp (Macrobrachium acanthurus). The article concludes with a section entitled "How to Distinguish the Edible Shrimp," which provides a guide for identifying the various species mentioned above. Photographs of all the species discussed, except the river shrimp, are included in the article.

SMALL BUSINESS:
Public Relations for Small Business Owners, by Raymond W. Miller and Robert W. Miller, Small Marketers Aids, No. 27, 4 pp., printed. Available free from the Small Business Administration, Washington 25, D. C.

TERRITORIAL WATERS:
Addendum to Comments by Governments of the Provisional Articles Concerning the Regime of the High Seas and the Draft Articles on the Regime of the Territorial Sea Adopted by the International Law Commission at its 7th Session, A/CN.4/99/Add.9, 8 pp., processed. United Nations, International Law Commission, New York, N. Y., July 3, 1956. For sale by International Documents Service, Columbia University Press, New York 27, N. Y.

Regime of the High Seas and Regimes of the Territorial Sea (Addendum to the Report), by J. P. A. Francois, Special Rapporteur, A/CN.4/97/Add. 3, 17 pp., processed. United Nations, International Law Commission, New York, N. Y., May 9, 1956.

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For sale by International Documents Service, Columbia University Press, New York 27, N. Y. Summary of replies from Governments and a continuation of the conclusions of the Special Rapporteur.

Yearbook of the International Law Commission, Vol. I. Summary Records of the 8th Session, 23 Apr.-4 Jul. 1956, A/CN.4 SER.A/1956, 293 pp., printed (Sales No.: 1956.V.3, Vol. I) $3. United Nations, International Law Commission, New York, N. Y., November 1956. For sale by the International Documents Service, Columbia University Press, New York 27, N. Y.

Yearbook of the International Law Commission 1956. Vol. II. Documents of the 8th Session, Including the Report of the Commission to the General Assembly, A/CN.4/SER.A/1956/Add.1, 303 pp., printed (Sales No.: 1956.V.3, Vol. II) $3. United Nations, International Law Commission, New York, N. Y., November 1956. For sale by International Documents Service, Columbia University Press, New York 27, N. Y.

TUNA:

An Analysis of Methods of Sampling to Determine the Size Composition of Commercial Landings of Yellowfin Tuna (NEOTHUNNUS MACROPTERUS) and Skipjack (KATSUWONUS PELAMIS), by Richard C. Hennemuth, Bulletin vol. II, no. 5, pp. 174-243, illus., printed in English and Spanish. Inter-American Tropical Tuna Commission, La Jolla, Calif., 1957. Catch statistics of the Eastern Pacific fishery for yellowfin tuna and skipjack are being collected and analyzed in order to provide the factual information required for maintaining the catch of these species at maximum sustainable levels. To provide the necessary basic data, a program of collecting length-frequency samples from the commercial catch was started in July 1954. Initially, the design of sampling was arbitrary because of the lack of necessary estimates of variability. Several methods of drawing fish for measurement were employed to furnish a basis for subsequent establishment of adequate, routine sampling procedures. The purpose of this paper is to compare estimates obtained from the different methods of sampling, and to determine the most efficient plan for future sampling.

TURTLES:

"Breeding Turtles for Profit," by Ronald Powell, article, The SPC Quarterly Bulletin, vol. 7, no. 3, July 1957, pp. 41-42, illus., printed, single copy 30 U. S. cents. South Pacific Commission, Box 5254, G.P.O., Sydney, Australia. A very brief article on the green turtles and their eggs which are taken on Palmerton Atoll in the Cook Islands. Following successful initial experiments, the author suggests that breeding turtles in captivity might well prove a worthwhile commercial venture.

UNITED KINGDOM:

White Fish Authority, Sixth Annual Report and Accounts for the Year Ended 31st March, 1957, 51 pp., printed, 2s. (28 U. S. cents). Her Majesty's Stationery Office, London, England. Presents a general description of the White Fish Authority, its functions, income, and expenditures. Sections on production of fishery products, marketing and distribution, research and experiments, training courses, and investigations are also presented.

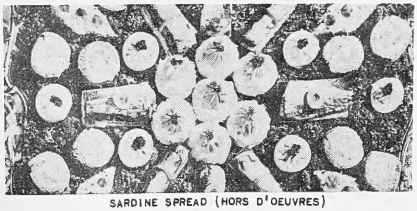
WHALING:

Antarctic Hazard, by W. Ross Cockrill, 230 pp., illus., printed, $4.75. The Philosophical Library, Inc., 15 East 40th St., New York 16, N. Y., 1957. A thrilling and amusing first-hand account of a modern Antarctic whaling expedition. The author describes every phase of the whaling industry from the hunt and kill in the far whaling grounds of the Ross Sea and Weddell Sea, to the landing in Britain of the valuable cargo of oil, dried meal, and frozen blocks of whale steaks.

"Whaling Operations in the Antarctic, Season 1956/57," article, Norsk Hvalfangst-Tidende (The Norwegian Whaling Gazette), vol. 46, no. 8, August 1957, pp. 438-446, 449-454, 457-462, illus., printed in English and Norwegian. Norsk Hvalfangst-Tidende, Sandefjord, Norway. An extract of the material submitted at the meeting of the International Whaling Commission in London from June 24-28, 1957, on whaling operations in the Antarctic in the season 1956/57. It presents the chief regulations governing pelagic whaling, catch material and results, whaling period, oil yield per blue-whale unit, average size of the whales captured, percentage of immature blue and fin whales in pelagic catch, and ratio of blue and fin whales in the catch.

FISHERY MOTION PICTURE

The following motion picture is available only from the source given in the listing.



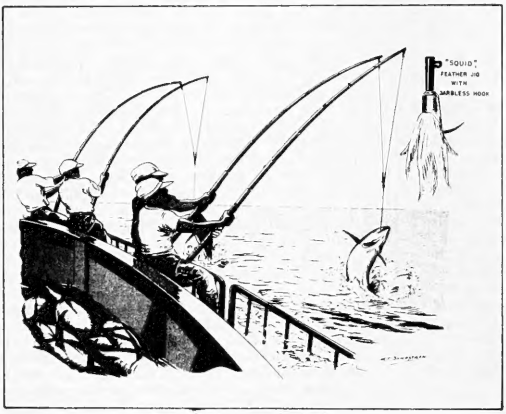
SARDINE SPREAD (HORS D'OEUVRES)

Sardines from Maine--Down-East Style, a 14-minute, 16 mm. sound and color film, produced and distributed by the Bureau of Commercial Fisheries, United States Fish and Wildlife Service, for the Maine Sardine Council which financed the film. This film is the Pine Tree State's proof of its assertion that the Maine sardine is a four-season food that can be served in sundry and unique ways. It is another in the growing list of educational films made possible by the cooperation of units of the Department of the Interior and industry. Distribution prints have been made available to the Bureau of Commercial Fisheries by the Council for

free public distribution through a film library system made up approximately of 150 libraries which distribute Bureau films. This new film will supplement It's the Maine Sardine, which was produced nine years ago. The original was awarded first prize in the public relations category at the Venice International Exhibition of Cinematographic Art in 1951 and still heads the list of requests for Bureau pictures. The new film is "down-east" in every detail, from the brief scenes showing the taking of the fish from the cool Maine waters right through a whole series of tried-and-true Maine recipes being prepared and served against a colorful Maine background. But though this motion picture is so typical of the Pine Tree State, its theme and the presentation of that theme will whet appetites in any part of the country. The picture is primarily directed toward the housewife, showing her the many ways the sardine--whether packed in oil, mustard, or tomato sauce--can be used as a budget and appetite-satisfying principal dish, in sandwiches or salads, as appetizers for family or party menus, or for such extensive programs as school lunches.

TUNA FISHERY

Over 75 percent of the United States annual catch of tuna is taken by Pacific coast bait boats or tuna clippers, which are the most expensive fishing boats afloat. Ranging from 65 to 150 feet, these craft are distinctive and picturesque, with a raking stem and raised decks forward. The majority have the hold divided into watertight compartments to hold the frozen tuna during the return trip.



TWO-POLE TUNA FISHING

Hook-and-line fishing is the order aboard the clippers, using live bait, a feather lure, or even a bright metal bare hook. On locating a school of tuna, live bait is thrown overboard to attract the tuna to the vessel. As they come in to take the bait, the fishermen cast their barbless hooks. In their eagerness to eat the live bait, the tuna take the lure. If the fish average less than 30 pounds, one man can land an individual fish. If they range between 30 and 50 pounds, two men are required, and for fish over 50 pounds three men team together to land them.

CONTENTS (CONTINUED)

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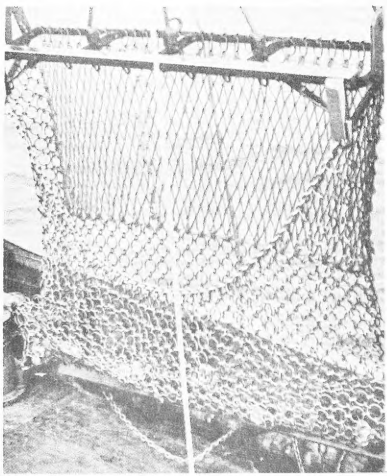
SEA SCALLOP BOATS AND GEAR

The sea scallop fishery is the most valuable of our North Atlantic offshore fisheries. Fishery Leaflet 422, Sea Scallop Boats and Gear, describes the fishery, the scallop grounds, and the gear used by scallop draggers. It is illustrated with photographs and sketches showing construction details of an 11-foot sea scallop dredge.



DREDGE INSIDE THE RAIL.

The sea or giant scallop (Placopecton magellanicus Gmelin) supports a fishery which in 1955 was valued at $11.4 million. Fifty years ago fishermen reported 10-inch sea scallops, but none of this size have been reported in recent years. About 92 percent of the 1955 catch consisted of scallops under 6 inches. The sea scallop has been dredged from the northern shores of the Gulf of St. Lawrence to Cape Hatteras, usually on gravel, sand, or sand-mud bottoms. In the north, it is frequently found just below low-tide mark, but south of Cape Cod it is restricted to the deeper, colder offshore waters.

The greatest known sea scallop grounds are found between the 20- and the 50-fathom curves on Georges Bank. The grounds in this general area for the past 10 years have been the most consistent producers of sea-scallop crops.

There are about 70 or 80 boats of the New Bedford fishing fleet now rigged for fishing sea scallops. They range from 60 to 100 feet long and are powered by Diesel engines up to 550 horsepower. All are equipped with depth finders, Loran, and ship-to-shore radiotelephones. Almost all of them are fairly new and extremely seaworthy craft. Construction and deck arrangement is very similar to the usual medium-size New England dragger. Many of the boats change over from trawling to scallop fishing and back again to meet changing fishing and marketing conditions. Any well-constructed dragger can rig up for scallop fishing by removing the nets and otter boards and taking aboard the shucking boxes, wash tank, the booms necessary for handling the dredges, and the dredges. The same double-drum fishing winch, wire rope, and forward gallows frames are used.

This 11-page leaflet (F. L. 442) is available free from the Division of Information, United States Fish and Wildlife Service, Washington 25, D. C.